

B-57 CANBERRA

AT WAR 1964-1972

Robert C. Mikesh





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and printed by Ian Allan Printing Ltd at
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Runnymede, England.

Previous page: The flat, swampy Mekong
Delta country spreads out beneath this flight
of USAF B-57 Canberras as they return
from a strike against the Viet Cong. Weather
was tropical, normally with low scattered
clouds which often hampering air strikes.

Below: 'Patricia Lynn' RB-57E aircraft were
easily distinguished by their uniquely
shaped nose. Note camera window. Here 243
starts-up during initial ferry flight to
Vietnam in May 1963. Aircraft remained
unpainted until 1965. /D. Wachholz



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Above: This dramatic picture was taken at near bomb release point in the LABS manoeuvre. When just past the vertical position in an Immelmann turn, the bomb was released giving the airplane time to escape before the bomb peaked out around 9,000ft and started down. B-57s were the most accurate and stable aircraft for this bomb delivery method.

Foreword

Americans, for reasons known only to ourselves and not often discussed, seem to have a penchant for using old aircraft. Our F-4, for example, is over 20 years old. The sons of former pilots of B-52s are now flying them and we are talking about extending their life up to the 1990s. When the middle 1980s come around, as of now, there will be only one fighter in production, the F-18 Hornet, and no modern penetrating bombers. We have done this in spite of the fact that the Russians are constantly improving their air fleet that is now very close to the United States inventory. I must say that in spite of this leaning toward ancient aircraft we seem to have gotten away with it, and probably the finest example is the B-57 Canberra, a design that first flew in 1949. Using World War II techniques, its earliest concept was as a high altitude radar reconnaissance-bomber, yet because of its sound design, it also became a very effective low altitude ground support aircraft. Between this range of operating extremes it has been modified and remodified to perform every conceivable mission capable of accomplishment by an airframe of its size, and it is still with us in our Air Force today.

My experience with the B-57 as a pilot began with 'Star Flight' at Andrews AFB, near Washington, DC, in the early 1960s. This unit was comprised of a handful of B-57s and pilots set aside for administrative flights for those of us who could share the flying duties as well. It was here that I first met author Robert Mikesh and we often flew together when I had need to quickly visit a distant Air Force Base. Straight and level flying is fine for getting somewhere, but there were opportunities to see what the airplane could really do. After Bob demonstrated a loop off the deck in this bird, then let me try my hand, I couldn't help but exclaim, 'By golly, this really flies like an airplane should.' I was impressed with its manoeuvrability which was far better than I



would have expected of an aircraft of this size. Its soundness and flexibility in mission profile has made it a superb combat weapon, and it served in that capacity year after year in South-East Asia compiling a remarkable record for itself. It is amazing, considering the length of time this aircraft has been in service, that it has performed so well in so many different capacities. Because of this, it has gathered hundreds of admirers over the years, especially from those of us that have had the rewarding firsthand experience of flying and working with this rugged, versatile airplane – the Canberra.

Barry Goldwater
United States Senator

Barry Goldwater has been Senator from Arizona for 22 years and once was a candidate for President of the United States. He is a staunch advocate for a strong military force for the United States and has served many years on the Senate Armed Services Committee. In this capacity and as an Air Force Reserve Major-General, having received his military wings during World War II, he takes every opportunity to acquaint himself, firsthand, with the flying equipment of the military services. In pursuit of this, Senator Goldwater has several hundred hours, first pilot time, in the B-57 Canberra.

Barry Goldwater
U. S. S.

Introduction

My first glimpse of the Canberra was the classic photo of it in a steeply banked turn at the introductory show at Farnborough in September 1949. My reaction after disbelief, was relief – that this was *not* a USAF plane that I might one day have to fly. To me, its straight, wide and stubby wings looked totally antiquated. How quickly we change, for in a short time I was waiting anxiously for our unit to be equipped with the American-built version of this bomber, and from the first time I flew the B-57, I was hooked on it forever.

Time has proven that the straightforward design was correct, for at this writing, the basic airframe design has been in continuous service for 30 years. As the immortal DC-3 is the great workhorse of the air transports, the Canberra will certainly occupy a similar niche in history among combat aircraft.

This acceptance by the United States Air Force in lieu of American types is a lasting tribute to the British design team that created it. By the time production B-57s were reaching tactical bomber units, the Douglas B-66, also in production, was being converted to other missions even before its acceptance in the tactical bomber role. For years the B-57 remained the only jet tactical bomber in the USAF. When it had dropped its last bomb, there were no pure tactical bombers to replace it.

Perhaps the term ‘tactical bomber’ in itself is obsolete, for ‘attack aircraft’ and ‘fighter-bombers’ fill this mission requirement of close air support that the B-57 did so well. The term as well as B-57s themselves, nearly came to an end as far back as the late 1950s when tactical bomber units began phasing out at a steady rate due to mandatory military cutbacks. Only one combat wing remained (yet it too was scheduled for deactivation) when an escalating war situation in South-East Asia reversed Air Force thinking. The Canberra played an important part in the nine years of combat that followed. When the fighting ended, the B-57s were removed from the role of USAF combat aircraft, and the dwindling numbers retained in service were reassigned to a peacetime mission. At this writing however, B-57 tactical bombers still fill the ranks of the Pakistan Air Force as combat-ready aircraft as they have done for the past 20 years.

Earlier than I like to remember, I decided one day to write a book about the B-57, for I was in my third pilot assignment with Canberras and they had become an important part of my life. I began gathering information about the airplane and its crews and soon had more material about the B-57 than one book could handle. The basic overall story of the American-built Canberra is told here, but readers close to the subject will recognise that lesser aspects of its history have been passed over lightly, and others omitted completely. One book cannot contain all the detail I would like – the total story of the B-57, an airplane that has served in so many capacities and has already been around for more than 25 years. Very little of the history contained here has ever been recorded until now.

Much of the credit for the content of this book is shared with many people, including

Below: A Martin B-57 of the 13th Bomb Squadron takes off from Bien Hoa AB, for an air strike against the insurgent Viet Cong forces in Central Vietnam./USAF



fellow *Canberra drivers* who had some facts more clearly in their mind than I. Many of their names appear throughout this history, for airplanes and people cannot be separated. The B-57 has touched many people – those that designed and built the Canberra, the crews that flew it, and those that supported it on the ground – I only regret that everyone's contributions cannot be recognised within this history of an aircraft that will not be easily forgotten.

Acknowledgements

Space does not permit the names of all who have contributed in some degree to this history about the Canberra. Nor is there space to mention the speciality area in which a person was particularly helpful. My gratitude to all must be accepted by this sincere thanks for their frequent, timely, and willing help. Heading this list – and rightfully so, is Ramona, my patient wife, who occupied herself during times we would otherwise share together, while I was absorbed over the long time period of writing this book. She was always willing to proof read and offer constructive suggestions when needed. Without her encouragement and faithful help, this book would not have been written.

My special thanks for their individual help go to David A. Anderton, Douglas J. Beggerly, Ellis E. Bruch, Frank R. Chandler, Robert P. Coombs, Peter Cotellesse, Robert A. Danielson, Carlton 'Jake' Dolwick, Gene R. Durden, Judy Endicott, James L. Goodnight, Irwin 'Pat' Graham, Paul R. Guthals, Joseph A. Guthrie, Jr., Roger D. Harrington, Gerard Hasselwander, Kenneth H. High, Robert Hunter, Lynn M. John, Albert T. Keeler, John N. Kendrick, Charles D. Leonard, John W. Little, Robert Lince, Robert D. Lutes, Rex Marlowe, Larry B. Mason, Walter J. McGinnis, Royce F. Miller, Clyde E. Millington, Dudley L. Mizer, Lee A. Mongeon, Donald N. Nation, Paul R. Pitt, Gerry I. Repenon, Jerry W. Russell, James J. Scanlon, David Schoem, J. T. Stanley, E. 'Ted' Sturmthal, O. E. 'Pat' Tibbs, Norman Thompson, Gerry Turner (RAF), Darrell Van Citters, Robin A. Walker, and Eugene E. Youngs. As Martin's Field Representative, Gene Youngs was always on the B-57 scene, and for nearly 20 years has contributed information in preparation of this book. To all those who have helped, I convey my grateful thanks.

Washington, DC, USA, 1979

Robert C. Mikesh



Birth of the Canberra

The merits of an airplane can often be measured against what it was designed to do and how well it meets those requirements. The success of the Canberra is not only attributed to having fulfilled the initial design requirements, but due to the 'stretch' capability of its basic design, it became highly adaptable to a multitude of other tasks as well.

To trace the concept of the Canberra to its very earliest glimmer may well have been the idea that Mr W. E. W. Petter had for a jet fighter-bomber replacement for the Royal Air Force's Whirlwinds and Typhoons. In 1944, 'Teddy' Petter was Technical Director for Westland Aircraft Ltd, when the jet age began, and any tactical airplane having a propeller was immediately declared obsolete. How far Petter's jet aircraft concepts were developed before he left Westland go unrecorded for they may have been merely doodles on paper. However, that same year he moved to Preston, Lancashire, to become Chief Designer for English Electric Company Ltd, leading a new design team, for English Electric had not built an airplane of their own design since 1926. The company had suspended its aviation activities that year and this had lasted until 1938 when the war years brought English Electric back into the aviation field by manufacturing aircraft of other companies, namely the Halifax and Hampden bombers. When jet powered aircraft came into the picture, the Ministry of Aircraft Production invited English Electric to develop a jet aircraft design written around their own proposal of meeting certain broad requirements.

Starting with his earlier thoughts on jet aircraft design, Petter and his new design team members considered a jet bomber concept, one that might have the qualities that would replace all RAF bomber types then in service, considering in particular the mission requirements ranging from the Mosquito to the four-engine Lincolns.

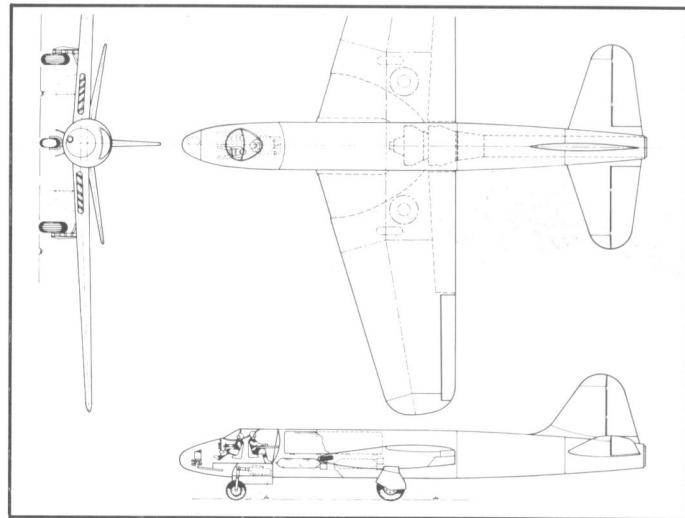
Design work began, and by June 1945 the new airplane had the lines of a mid-wing monoplane, powered by a single, very large turbojet, crewed by a pilot and navigator. The entire design was built around a proposed Rolls-Royce engine which was to have a 5ft 6in diameter, which they planned to mount

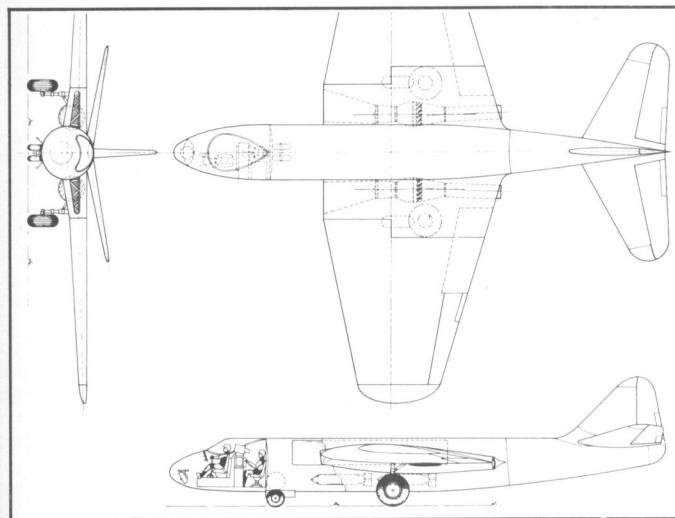
in the centre of the fuselage. This two-stage centrifugal engine, though unusually large, was expected to produce 12,000lb static thrust – enough to make anyone take notice in those early jet years. The single unit concept was decided upon after a careful study had been made of other engines then available, and all were considered inadequate for a bomber. Although the craft would be large, weighing in the neighbourhood of 40,000lb, it would cruise at 500mph at between 35 and 40,000ft. Even in this embryonic stage, the design showed a resemblance to the now familiar lines of the Canberra.

Before the design study became too advanced, the rapid development of jet engines led the English Electric design team to re-examine its plan, and in so doing dropped the single engine concept substituting two engines buried in the wing-roots. The new engines were axial flow Rolls-Royce AJ65s, a forerunner of the Avon, having a much smaller frontal area than the originally considered centrifugal engine. With the oversized engine no longer in the fuselage, the bomb bay area was expanded to carry an assortment of weights including one 8,000lb bomb. Fuel tankage was reduced since the axial flow engine had a lower specific fuel consumption

Right: First flown on 13 May 1949, the cleanly contoured English Electric Canberra, was Britain's first jet bomber. Its concept was so right that it remained in production for 12 years, and is still in service today in both British and American models. Low wing loading and a low aspect ratio wing were designed into the Canberra, giving it fighter-like handling qualities, as well as high altitude capability resulting in maximum fuel economy.

Below: The origin of the Canberra series began with these two early proposals. In 1945 this jet bomber was a single engine concept having the centrifugal-flow jet engine buried in the fuselage. By 1946 with the advent of axial-flow jet engines, the proposal had two of these engines mounted in the wing roots. Design changes that followed, evolved in a logical development pattern that became the prototype Canberra.





for the designed range of the bomber. The elimination of the fuselage jet tail-pipe also made possible a simpler and lighter weight aft section. Engine air inlets remained in the leading edge of the wing which had been established in the single engine design.

When the newer Rolls-Royce engine appeared in late 1945, the design was again modified by placing these engines within the wing at about the one third span point. As weight reduction continued in the design, the wing area was able to be reduced from 1,040 to 960sq ft without increasing the planned wing loading, and the aspect ratio was also reduced from 5.4 to 4.9. With this third conceptual design for a jet bomber, the configuration we now recognise as the Canberra began to take form.

Since the newly organised design team was a new addition to the English Electric Company, their initial home was temporarily in a wartime acquired garage in Preston and it was

there, in the lower level of the building, that the shape of the Canberra was put together in the form of a wooden mock-up. The design met the Ministry of Supply B3/45 specification and on 7 January 1946, a contract for four prototype English Electric A1 aircraft (as the unnamed Canberras were then called) were ordered for production and test evaluation.

A whole new field of performance factors complicated the initial design strength for this and all other jet planes. As aircraft speeds approached the compressibility stage near the speed of sound, a new set of structural strength rules had to be developed relative to the speed of sound. The measurement of speed in the conventional manner of miles-per-hour, had no relationship to speed of sound, which varies with height and temperature. This new method of speed values came in the form of Mach numbers, where Mach 1 equalled the speed of sound, and measurement of speed is made from this point. The Canberra was not intended to be a transonic or supersonic aircraft when carrying a useful military load since it was unlikely that greater thrust would be obtainable from two Avons during the operational life of the aircraft. Instead it was to operate at high altitude in the Mach 0.7 range, therefore its design could remain uncomplicated because it introduced few engineering problems associated with speeds closer to Mach 1, which were then difficult to overcome. This simplicity was the secret of its success. It was built to meet certain performance factors in the most practical structural form, thus eliminating complications in unproven design theories for high speed.

The wings of the Canberra were not swept back as no advantage would be gained at the maximum speed for which the aircraft was designed to fly. According to 'Teddy' Petter, the technical solution was found to lie primarily in the right choice of wing. A light wing loading, a comparatively low aspect ratio, a smooth structure and a modest thickness/chord ratio were all deemed to be prerequisites. In addition, great strength could be built into the wing because of its thickness, without being a deterrent to its speed. The depth of 27in was a mere 12% in relation to its fore-and-aft measurement of 19ft which was large for an airplane of this size, and the upper and lower surface curved equally about the fore-and-aft centre line of the wing. This symmetrical airfoil section was employed as a means of avoiding violent pitch-changes when the critical Mach number was exceeded, yet without sacrifice of good control characteristics.

A high altitude performance was the objective for the design of this airplane rather than speed. When measured against the



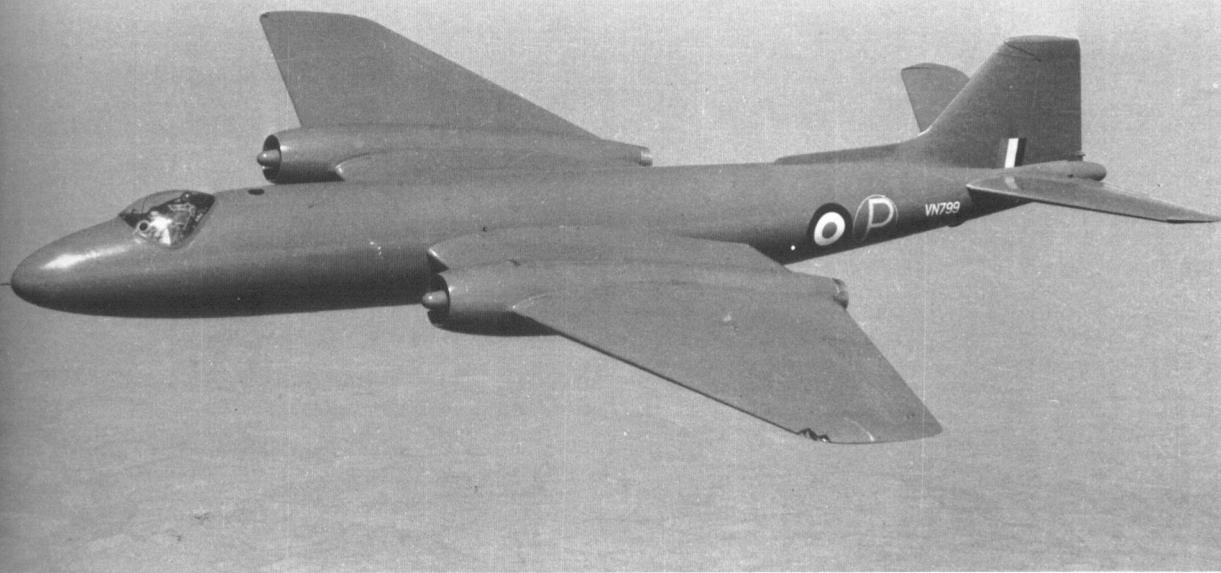
Meteor, which had a practical intercept altitude of 40,000ft, the design of the Canberra with its low wing loading, was to have the same turning ability at 50,000ft, giving the bomber a drastically superior performance over fighters of that period. In anticipation of this mark of performance, defensive armament was not considered in the design.

As the construction of the first Canberra began in near wartime security at Preston, English Electric acquired the former American aerodrome at nearby Warton, where final assembly and first flights would take place. By early May 1949, taxi tests began with Roland Beamont at the controls. Beamont had been with the company for two years after leaving the RAF as a wing commander, and had followed the development of this jet bomber from its beginning.

Once completed, the Canberra was proven ready for flight with three 10ft high hops during taxi trials that took place on the day before the scheduled first flight. These hops were at Beamont's insistence, for this would confirm the effectiveness of flight controls before being fully committed to the air. The fact that each of these hops was for a distance of about 1,200ft after a take-off run, and then landing, all well within the runway length and without over stressing with wheel brakes, was the first practical proof of the exceptional qualities of the airplane.

When the day for the first flight arrived, Petter was overheard to ask Beamont if he 'really wanted to fly today?' It was Friday, 13 May 1949. Beamont responded, however, that

Above: The grand-daddy of them all, VN799, the B1, Britain's first jet bomber, designed and built by the English Electric Co Ltd, now British Aerospace Corporation. In its earliest form, this prototype had a stability dorsal fin, and rounded rudder tip, later to be deleted./BAC



'it was as good as any other day,' and proceeded to take the Canberra off the runway at Warton for its maiden flight which lasted 27 minutes.

All that was hoped to be accomplished on that initial flight of England's first jet-bomber was realised. The only uneasiness experienced during the flight was a sharp directional jerk each time rudder pressure was applied. Once assured that rudder trim was centered, no further rudder movements were made that might aggravate the situation. Following the flight, Beamont made the following entries in the flight report which serve to illustrate his enthusiasm for the airplane:

'Apart from the rudder condition described, the aircraft handled smoothly and easily. All services operated satisfactorily although in the

case of tailplane actuation some alterations (as to rate) may be necessary ...'

'Both engines and airframe were remarkably quiet in flight and the noise level in the cockpit allows excellent radio reception ...'

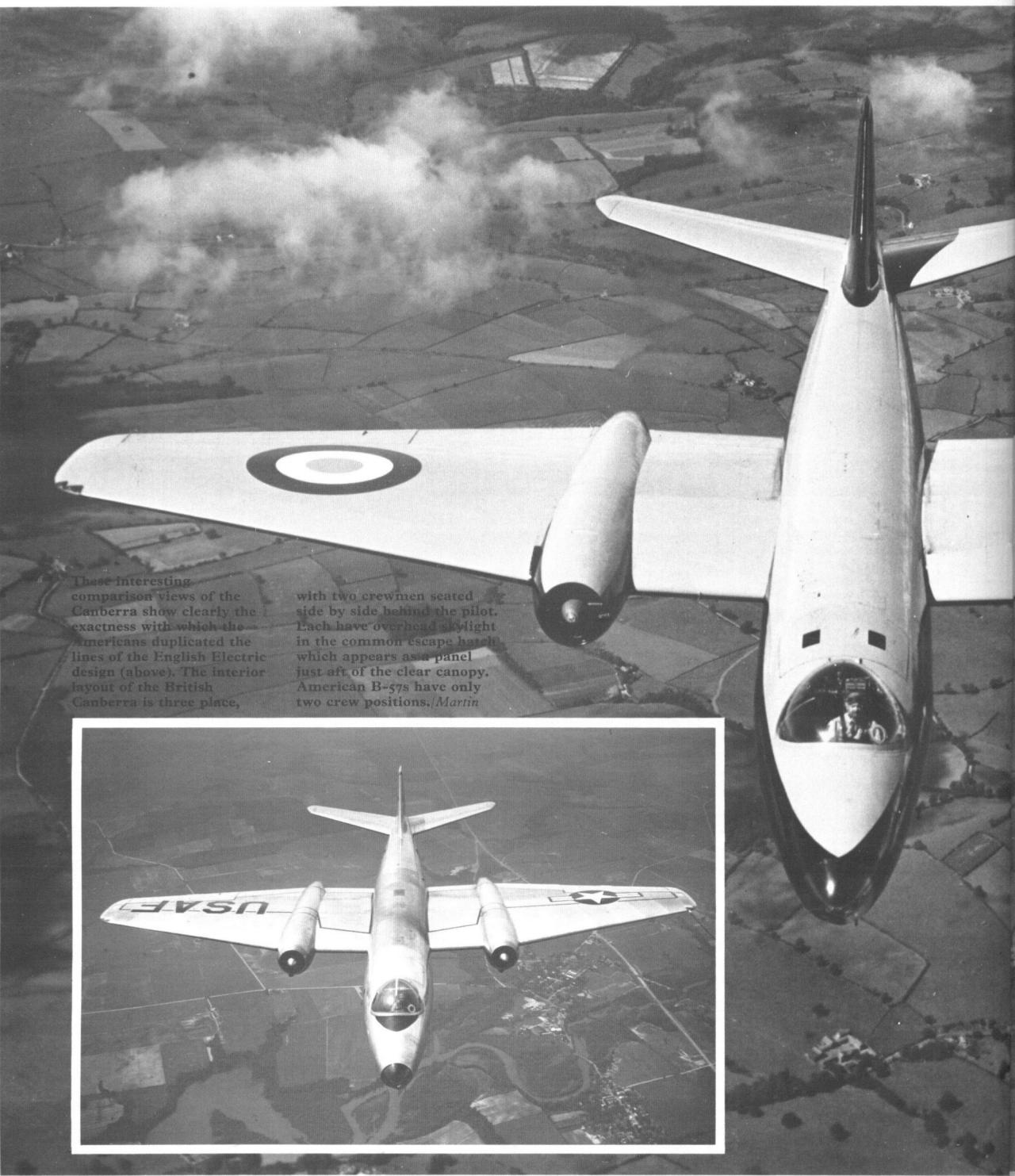
'Rudder and aileron trimmers were set at neutral for take-off and were not required again in the flight ...'

Following the flight, and based on Beamont's recommendations, the rounded top of the rudder which included the balance horn, was trimmed down, and no further suggestion of directional problems were encountered. This accounts for the squared off appearance of the rudder that carried into production models.

On flights that followed, Beamont discovered that the aircraft performed more like a fighter

Above: The Avon RA2 powered prototype Canberra in the air. Tip of rudder has already been trimmed which proved necessary after the first flight. Dorsal fin was eliminated on production models. Bare-headed Beamont can be seen in the cockpit of the blue painted craft./BAC

Left: Entrance to the Canberra cockpit was a high step through the overhead hinged, pressure-sealed hatch on the starboard side. Canopy-windscreen combination was most unusual in being one-piece and a double layer with an airspace between to prevent fogging. In this production model B2, a crawl way linked bombardier's station behind pilot seat, to the forward clear nose section for operating the bombsight. Flat nose glass is off centre to align with bombsight optics.



These interesting comparison views of the Canberra show clearly the exactness with which the Americans duplicated the lines of the English Electric design (above). The interior layout of the British Canberra is three place,

with two crewmen seated side by side behind the pilot. Each have overhead skylight in the common escape hatch which appears as a panel just aft of the clear canopy. American B-57s have only two crew positions. *Martin*





than a bomber. Aerobatics had not been written into the design requirements but, flown within the design limits of speed and 'G' forces, there was nothing to limit the airplane from rolls and loops. Exploring its potential away from inquisitive eyes, Beamont prepared a flight routine for the coming Society of British Aircraft Constructors' Exhibition and Display at Farnborough that September, which would punctuate the Canberra's first public showing. As expected, the airplane stole the show. The American publication *Aviation Week* tells of this often talked-of event:

'Canberra Shows Off – biggest military surprise of the show was the English Electric Co Ltd sky-blue Canberra jet bomber. US observers were not impressed with the Canberra's straight wing and somewhat conventional configuration on the ground. But in the air the combination of test pilot R. P. Beamont and the 15,000lb thrust from the two axial Avons made the Canberra behave in spectacular fashion.

Its speed range from 500 to less than 100 mph was ably demonstrated by Beamont who followed his high-speed passes on the deck with an approach using full flaps and gear down and bomb bay doors open that slowed the Canberra to less than 100mph. At this speed he rocked the big bomber violently with ailerons to show the full control available as it approached stalling speed.

Beamont whipped the bomber (designed to carry a 10,000lb bomb load) around on the deck like a fighter, flying it through a series of slow rolls, high speed turns and remarkable rates of climb. The Canberra was originally designed for radar bombing at around 50,000ft, but Beamont's demonstration convinced many Britishers the new bomber may prove to be another Mosquito in its versatility at everything from low-level attack through high fighting to high altitude bombing.*

The Canberra met with immediate acceptance. Production orders for the RAF's new bomber were filled not only by English Electric, but Handley Page Ltd, A. V. Roe, and Short Brothers & Harland as well, to a total of 546 machines. Capitalising on its speed and performance, it was quick to set innumerable records throughout the world. Its model variants are countless, as well as its service in air forces of other countries. As a combat plane for what it was designed to be, it has proven its worth in more than one conflict. The list of British Canberra's accomplishments will be endless as long as it continues to serve its many users. But that is another book – and another story.

* © Aviation Week & Space Technology

Americans Become Interested

American spectators at early demonstrations of the Canberra were equally as impressed as all others, but the US military observers could not envisage what they might do with the airplane if it were theirs! As one reporter put it, 'it is neither "fish nor fowl" in that it is slightly too large to be a fighter, slightly too small to even be a "light" bomber.' To Americans, it fell in a class like that of the Mosquito, in which there was no comparable US type. But in 1949, this was not a problem for the Americans. It was totally a British aeroplane.

By 1950, however, the United States Air Force was in the market for an airplane to replace the aging Douglas B-26 Invader. With its sudden involvement in the Korean conflict, the Air Force was caught short with bomber types left over from World War II. United Nation's air superiority allowed curtailment of enemy supply lines during daylight hours, but it was at night that the North Koreans had little resistance to movement. The only bomber suited to the night interdiction role was the B-26, and night attack with these nimble aircraft was purely visual.

As a B-26 night intruder pilot in Korea, in the early stages of my Air Force career, I felt that the most important aspect to a newer airplane was for it to carry more bombs and be able to remain longer over the supply routes in the target area. We had heard of a jet bomber being contemplated as a replacement for the B-26, but we could see little use for a faster airplane. There was also promise of sensing equipment that was under development to be used for non-visual night interdiction operations, but to use this sophisticated equipment properly, there was obvious need that a more advanced aircraft should be acquired first. An even more urgent reason was to have a replacement for the dwindling inventory of B-26s which, at wartime attrition rates, was forecast to be depleted sometime in 1954. Eventually, the concept of Air Force needs in terms of the next light bomber was focussed on night interdiction duties. This was in the summer of 1950, and a committee of Air Force officers were appointed to evaluate all available British, Canadian and United States aircraft that might be quickly adapted to the night interdiction role. To assure dis-

Below: In the early 1950s, the United States Air Force was badly in need of an aircraft to replace the Douglas A/B-26 Invader. This was a World War II light bomber, called upon for Korean War duty in which its numbers were being exhausted./USAF





Above: The Martin XB-51 was designed to meet certain military requirements, only to have them changed when the need for a night intruder materialised during the Korean War. This tri-jet came close to winning.
/Martin



Left: North American B-45 Tornado had promise in the night intruder role, but its structure was based upon World War II design. Two engine nacelles housed four J47 jet engines, resulting in good partial engine performance. Pilots rated it easy to fly. */North American*



Above: Another North American product in the evaluation was the AJ-1 Savage. This was already in fleet service but showed little growth potential for the Air Force requirement. Augmenting two R-2800 radial engines was one J33 turbojet buried in the aft fuselage area. *North American*

Right: The CF-100 built by A. V. Roe Canada Ltd was a very new fighter nearing production status. Not a potential jet bomber, those who flew it gained much in evaluating the all-weather and night flying qualities that could be built into such an aircraft.

patch, the selection was to be made exclusively from existing designs, since creating a new type would add years to development time. With this as a prime prerequisite, few could foresee that problems lay ahead which might well take longer to solve than those associated with a new design. Aircraft of existing types to be considered were the Martin XB-51, of which two were flying, the North American B-45 Tornado, already in the Tactical Air Command inventory in substantial numbers, the North American AJ-1 Savage, a composite jet and reciprocating-engine bomber, designed to operate from large Navy carriers and already in fleet service. Foreign designs included the A. V. Roe Canada Ltd, CF-100 Canuck, a twin-jet all-weather interceptor, and the English Electric Company's Canberra. This light bomber with its fighter-like manoeuvrability and speed, had possibilities!

After several gruelling months of evaluation by the board of Air Force officers, the final selection was to be made with flight demonstrations and comparisons at Andrews AFB in November 1950. The delayed arrival of the Canberra caused this date to be changed to 26 February 1951. While there was little doubt that the Canberra would out-perform its contemporaries, its flying demonstration was deemed necessary to silence those opposed to accepting a foreign aircraft into the inventory. Furthermore, a strong faction felt the Martin XB-51 was the best selection to make, but no firm decision could be made without a rigorous fly-off.





Right: For several weeks, bad weather across the North Atlantic delayed the arrival of the new Canberra in the United States.

Anxious spectators crowded around the sleek bomber as it came to Andrews AFB, near Washington, DC on 26 February 1951 where it was to be demonstrated. Its reputation for performance had preceded it and to many, it was a foregone conclusion that it would be selected by the USAF.

Below: The 19ft chord of this broad Canberra wing is dramatically demonstrated in this view taken soon after airplane's arrival in the United States. The low stance to the ground simplified the plane's maintenance appreciably. /Martin

Bottom: While the British Canberra was being considered for American acceptance, Martin's Chief of Flight Testing, O. E. 'Pat' Tibbs (right) is shown familiarising himself with gadgetry on the English bomber with Wg Cdr Roland P. Beamont (left) English Electric chief test pilot. An RAF crew ferried the Canberra to the US but Beamont did the demonstration flying. /Martin



The flight routine for each aircraft at Andrews was to be a tight turn in each direction over the spectators, a slow speed and high speed pass and finally a short field landing. Elementary as it may sound, all of this was to be accomplished in a maximum of 10 minutes, a difficult task if the aircraft was not highly manoeuvrable.

Flying the British entry was former RAF Wing Commander Roland Beamont, test pilot for English Electric, and the Canberra test programme. He was a master now in the Canberra, having flown the attention-getting show at Farnborough in an earlier version. His first reaction to the flight schedule was extreme disappointment, for it imposed an unreasonable limitation for demonstrating the full capability of the Canberra. Quick to see a solution to the problem, Beamont realised that nothing was said about use of any time left over from the allotted 10 minutes. The Canberra was easily capable of performing the routine in nearly half the prescribed time, while competing aircraft with heavier wing loadings such as the chief contender, the XB-51, could not complete the sequence in time.

To start the fly-off, the North American B-45 roared off the runway and into the distance, leaving twin thick smoke trails as it climbed almost imperceptibly into the clear morning sky. Eventually it reappeared, thundered past the spectators and homed in on the opposite horizon. Soon it returned and performed what



some interpreted as the programmed 360deg turn. But its time was already up and observers showed signs of impatience while waiting for the Tornado to land so the demonstration could continue.

The AJ-1 Savage and Avro CF-100 were far more agile and accomplished the routine in respectable fashion. Next, the Canberra's prime contender, Martin's XB-51 circled overhead and was seemingly unnoticed by the crowd. It did not land at Andrews, but proceeded back to its starting point at the Martin plant at nearby Baltimore. Now the real showstopper headliner was on stage and onlookers knew it. The star performer was the English Electric Canberra. Its low clearance to the ground and broad, yet stubby wing, were not pleasing lines compared to the more accepted swept wing designs, but in the air, its performance overshadowed any cosmetic shortcomings. After a short take-off roll, the bomber rotated at 80kts, and quickly assumed a 45deg climb at 150kts. After sufficient altitude was gained, it wheeled around, and still at full power, flashed past the crowd at nearly 500kts. With what sounded like a dual flame-out, power was chopped to decelerate and the plane was brought around into the first 360deg turn at a tight four Gs within the bounds of the airfield. Then a reverse in direction was made for the second turn, having advanced full power again, holding 2.5 Gs at 200kts. After completing this second turn in about half the width of the airfield, wings were levelled and

the Canberra shot up to an altitude where the gear and flaps were extended and it spiralled down to the scheduled slow fly-by at 110kts. This ended the programme with three and a half minutes remaining before the landing had to be made. Taking advantage of this time, Beamont snapped up the gear and flaps, applied full power and zoomed back to a thousand feet over the heads of the reviewing officers. Gear and flaps were dropped again and a tight 360deg landing pattern was executed which put the bomber on the runway with one-minute to spare.

This spectacular showing ended with some embarrassment, but the situation seemed ignored by many in attendance. At the point of touch-down, white sand that had recently been put down on ice went unnoticed by the pilot. With heavy braking pressure for a short run landing, the left wheel momentarily locked and blew the tyre. There was no damage, and some spectators regarded this as a further demonstration of the forgiving nature of the airplane.

This demonstration of aircraft at Andrews only helped to confirm a decision that had been all but finalised a few weeks earlier. The Canberra had been chosen as the most suited for the night interdiction role. The just completed aerial demonstration had been staged ostensibly to support this decision – a decision obscured by politics and one which was not overwhelmingly supported by those involved in the final selection.

Above: To those who saw the Canberra perform, there was no doubt that this new bomber was superior to all other aircraft in its class. The Americans needed a new jet tactical bomber, selected from existing designs, and the best plane was being built by a foreign power, fortunately an ally. There was no common ground for comparison, for the Canberra was a replacement for England's legendary Mosquito, another aircraft without an American counterpart. *Martin*

The Evaluation

The committee of officers selected to evaluate the airplane candidates spent six months on the project. Their objective was defined: first, match an existing airplane that can best destroy tactical targets at night and under bad weather conditions, one with the capability to destroy stationary and mobile targets with conventional and atomic weapons of sufficient size, and lastly; be capable of photographic and electronic reconnaissance. A more defined yardstick was developed with performance figures for use in measuring an aircraft's potential for the night intruder and tactical bomber/reconnaissance role.

Yardstick for night intruder (1950 concept)

Take-off ground roll:	3,000–5,000ft
Rate of climb:	5,000–8,000ft/min
Cruise, loaded:	350–450kts
Service ceiling:	30,000–40,000ft
Max speed:	450–550kts
Target area time:	6min bomb, 6min evasion
Bomb load:	6–10 500lb GPs
Guns:	6–10 .50cal or equivalent
Rocket capability:	May be carried
Radius of action:	800nm

Unfortunately, each aircraft evaluated had been designed for a different mission objective. Consequently, for this test, each had to be evaluated in relation to the mission for which it had been designed. Its adaptability to the light bomber role was then to be considered. The evaluation committee was more than casually interested in Canada's new Avro CF-100 Canuck, the prototype of which had just flown a few months earlier in January 1950. This was a two-seat all-weather and night twin-jet fighter, and had many of the qualities desired for the new tactical bomber. Because of its small size, however, they concluded that the Canuck could not carry a sufficient bomb load without a major redesign of its structure. Further, the maximum range that could be designed into the airplane was far short of that required for the bomber.

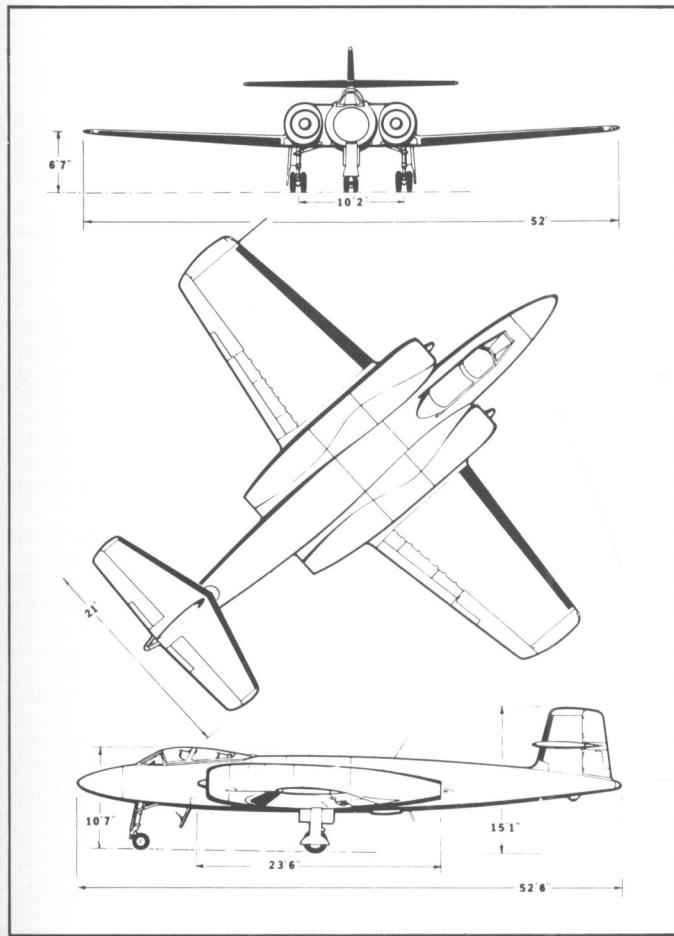
Just a year before the introduction of the CF-100, North American came forward in May 1949 with the AJ-1 Savage as a Navy carrier-based strategic attack plane. At the time it showed great growth possibilities, promise which failed to be fully realised. The plane had two R-2800 radial engines and a J33 turbojet located under the tail. The Savage had many of the qualities as a light bomber that the evaluation team was looking for. It

Right: Avro CF-100 Canuck.

Below: The CF-100 was most unusual in design with its thick centre section joining the two 6,000lb thrust Avro Orenda turbojet engines. With addition of tail warning devices to detect attacks at night or in weather, the evaluation committee graded the CF-100 able to survive combat encounters well beyond its anticipated operational life span. One measuring yardstick was ability to defend against attack by F-86 type fighters as seen in the background. /Avro

Below right: North American offered an alternative to the AJ-1 Savage, the A2J-1, featuring turbo-props and other refinements. Its development could incorporate the Air Force requirements, but the prospect was shelved in lieu of more advanced designs. /North American

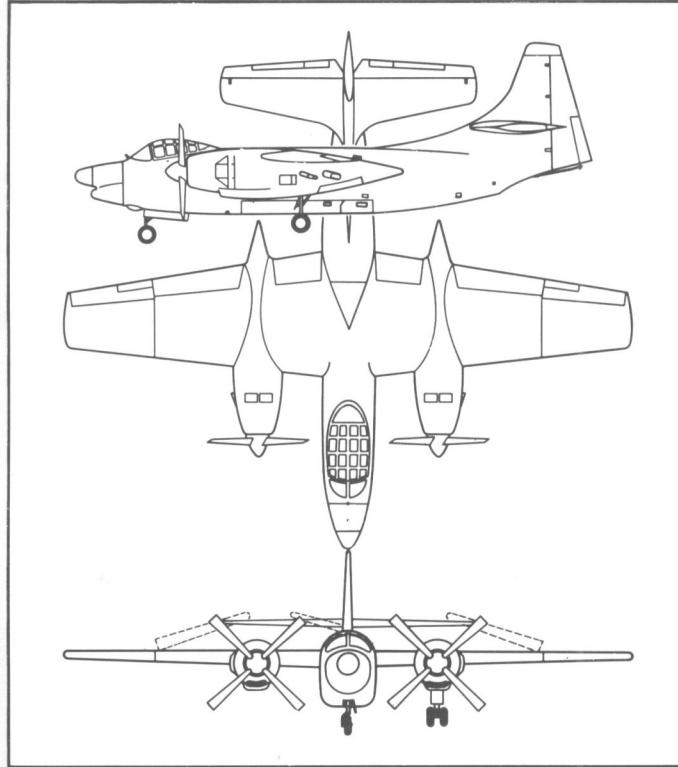




could operate well from short unprepared fields and had satisfactory range and loiter capabilities for the intended mission profile. Its bomb load capability was greater than required, yet the Savage retained its manoeuvrability to perform night attack missions. It proved to be a very stable bombing platform, a feature the committee was highly conscious of. The cockpit gave good all-round visibility to the side-by-side crew, except in rain, when droplets would just hang on the windshield. Interior layout was excellent for night operation and all-weather flying which matched well with the plane's stability. Unfortunately, the AJ-1 was one of those transitional aircraft that did not have the speed and performance being demonstrated by the new family of jet aircraft presently under development. This, coupled with the complicated hydraulic system, made the evaluation committee feel that the craft would be too vulnerable to aircraft and ground fire. Another objection was that this navy bomber did not carry forward firing or defensive armament. North American engineers gave assurance that this could be remedied, but the team members felt that such a major redesign would add penalties to the plane's performance, already marginal.

Consideration of the English Electric Canberra as a candidate for the night intruder mission was based on an earlier examination of the airplane in England by Air Force officials. In August and September 1950, this group led by Brig-Gen Albert Boyd, of the Air Materiel Command, had gone to England and been enthusiastic over the new bomber. Few disputed that England was more advanced in jet technology than any other nation. Furthermore, unlike others, the British were proud to share their finding with closely



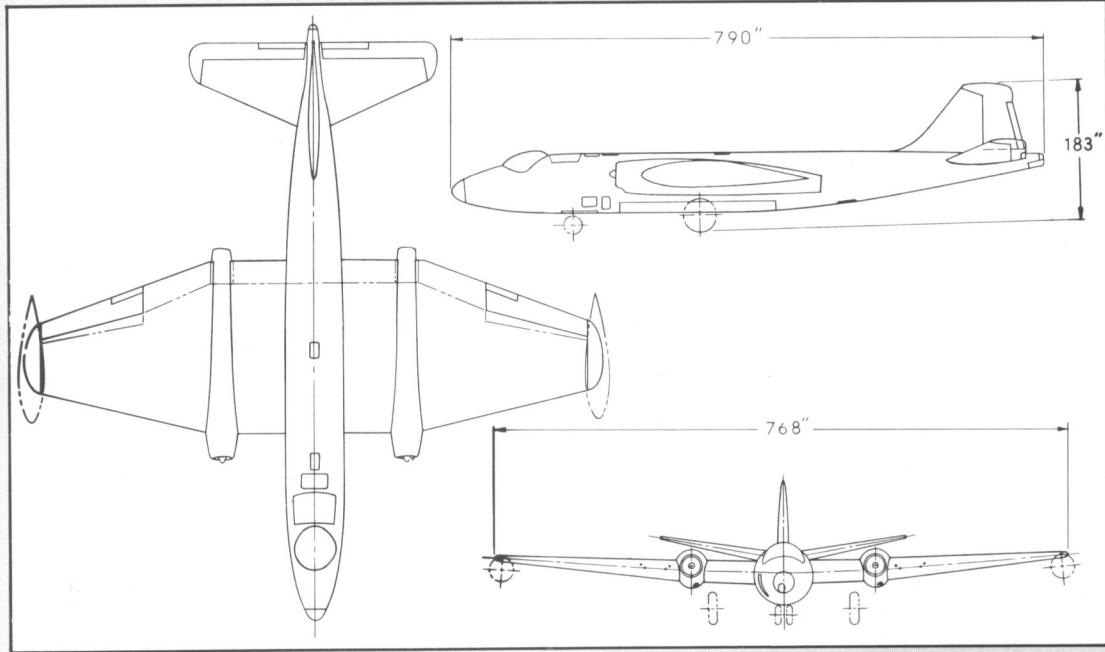


Above: North American
AJ-2P Savage.

allied nations. This superiority was based upon England's production of jet engines with greater thrust and durability than those of US jets. After enumerating the good and bad features of the Canberra, Gen Boyd and his committee concluded that by USAF standards, the British aircraft seemed best suited for the following three roles, in order of preference: all-weather fighter, tactical reconnaissance vehicle, and medium-high (25,000-45,000ft altitude) short range bomber. It is hard to envision this bomber as an all-weather fighter, but when examining the qualities needed for this type of mission, the Canberra possessed many of the key prerequisites. Among these were high altitude, stable platform with speed and range making it superior to any current or contemplated USAF all-weather fighter for combatting B-50 and B-36 type targets. Ironically, the recommendations pointed out that it was doubtful that the Canberra could be employed above 35,000ft because of acceleration limitations, a supposition which was to prove erroneous.

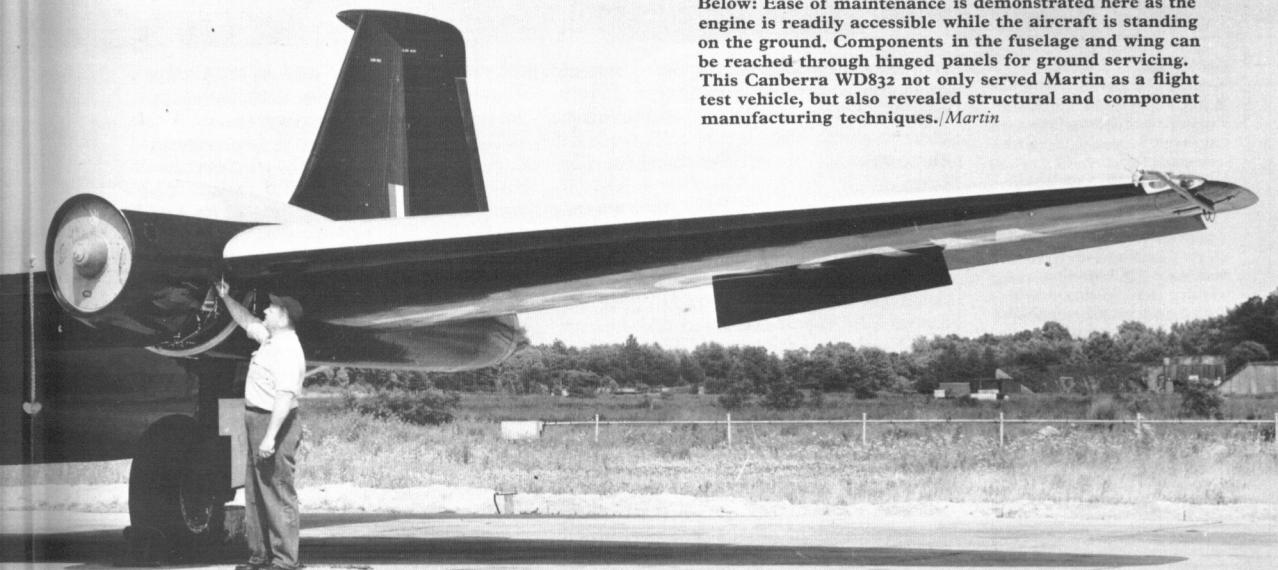
In the short range tactical reconnaissance role, the Canberra was able to operate at altitudes beyond the reach of a great majority of then operational interceptors. Finally, the success of the Canberra as a medium to high altitude, short range bomber seemed to hinge primarily on the capability of the navigation-bombing system to be incorporated into the airplane. The lower the altitude of the pen-





Above: English Electric B2 Canberra.

Below: Ease of maintenance is demonstrated here as the engine is readily accessible while the aircraft is standing on the ground. Components in the fuselage and wing can be reached through hinged panels for ground servicing. This Canberra WD832 not only served Martin as a flight test vehicle, but also revealed structural and component manufacturing techniques. *Martin*





Above: Early English Electric Canberras like this B Mk 2 were powered by Rolls-Royce Avon 101 engines of 6,500lb thrust as compared to the J65 Sapphire with 7,200lb of thrust built under licence from Armstrong Siddeley which powered the Martin B-57. The Canberra design was void of defensive armament, relying on its speed and manoeuvrability to escape interception. Martin's B-57 was developed from this variant.

tration and bombing run, the Canberra would be more vulnerable to MiG-15 type interceptors. In addition, speed would also have to be reduced on the bomb run to minimise bomb bay turbulence, further penalising the Canberra.

On a purely economic point, the reviewing group felt that a Canberra selection would have considerable merit by virtue of its incorporation into the MDAP (Mutual Defense Assistance Pact) programme. In that case however, it should be integrated into the USAF only after the successful conclusion of a 'rigorous evaluation' of at least one aircraft and accelerated service testing of 10 service-test models. At this point in the selection process, if the Canberra was, indeed, a potential American bomber, it would be purchased directly from British production lines for the US portion of MDAP participation. Given this set of ground rules, the Canberra must have really impressed the visiting selection board, especially when one considers how hungry US manufacturers were in the five years immediately following World War II.

One very pertinent observation from the committee noted that: 'It is mandatory that the USAF accept the general airframe, performance, and load carry capability *as is* in order to retain the advantages accrued as a result of

the design philosophy used in the Canberra aircraft.' In theory this is a desired concept, but in any new airplane, changes are inevitable and this group noted that if finally procured in production quantity, the airplane should have no less than 25 specified changes incorporated into it to make it suitable for USAF needs.

Now the qualities of the Canberra were to be evaluated for its merits in the night intruder/light-bomber role based on the Boyd report being reviewed by the committee. Taking into consideration the many good features the report noted, committee members felt, however, that the Canberra's greatest deficiency would be in target tracking - either air-to-ground or air-to-air, because of its light wing loading causing an unstable platform in turbulent air. Minute corrections would also be hard to make while following the bombardier's command. This may be valid in theory, but in actuality it did not hold true for this airplane. From my own flying experience in the B-57, it was a very 'rough rider' in turbulent air due to its non-flexing wing. More than once my lap belt could not be tightened enough to keep my head off the canopy, but turbulence did not set up an oscillation effect and it remained stable for easy target alignment. Bomb run corrections at altitude were often



'stiff', but practice and flight instrument interpretation compensated for this. Obviously, the committee did not have this actual experience with the Canberra from which to correct these assumptions obtained from the earlier report.

The Canberra's crew facilities were rated marginal. The pilot had sufficient cockpit working room but overhead clearance was shallow. The navigator, located behind and below the pilot, scarcely had room in which to work. His having to move forward to operate the bombsight, met with disfavour, and it was also questionable if the Norden bombsight, still standard in the Air Force, had sufficient space to be installed and operated.

Should the Canberra be selected for the USAF and purchased directly from British production lines, changes would have to remain minimal by both necessity and Air Force directives. However, the essential change recommendations included: (1) adding forward armament, (2) Shoran bombing system, APW-11 bombing-aid radar guidance system, and a suitable gun/rocket/bombsight, (3) standard Air Force instruments and lighting, (4) Air Force oxygen system, (5) engine and airframe anti-icing, (6) correct stick force gradient from a push force to a pull force in the landing configuration at speeds below

120kts, (more on this later) and (7) suitable cockpit ventilation for low level summer operations.

Despite the Canberra's obvious strong points, the apparent favourite throughout the evaluation with others in the Air Force was Martin's XB-51 of which the first of two was flown in October 1949. The original mission of this aircraft was low level attack on surface military targets in support of ground forces. Although this experimental bomber was 'caught in the middle' when the primary mission for the Air Force's new light bomber was changed, the XB-51 seemed a natural for the new role, even if it became difficult to match it to the requirements set down for the night intruder aircraft.

The XB-51 was a burly machine. It had two J47 jet engines of 5,200lb thrust, mounted on the lower forward side of the fuselage and a third J47 in the tail. Having a tandem (bi-cycle) type landing gear, there was not the normal pitch change for take-off and landing. A variable angle incidence to the wing operated when the wing flaps were extended. Another unique feature was the first time use of a rotatable bomb bay door on which the bombs were mounted. When open, its load was the same as external stores, but without speed restrictions, up to its maximum allowable for

Above: With the acceptance of the Canberra design for American usage, one of the first recommended changes was to add a drag chute to the tail cone. It became evident that this would be unnecessary for an aircraft able to stop after a 1,300ft roll at near empty weight, half that of the chief contender, the XB-51. Another unfulfilled prediction from armchair engineers was that the fin and rudder would be enlarged if accepted for American production.
/Martin

the airplane of .93 Mach or 540kts IAS, whichever was reached first.

This Martin entry was a highly manoeuvrable airplane for its size. At low levels it had a very satisfactory turning radius in the speed range of 280–310kts IAS, giving it excellent versatility for night bombing operations. However, its low limit load factor of 3.67Gs severely limited its capability during tactical operations and was graded unsatisfactory in this area of evaluation. Furthermore, despite a forecast of improved jet engines under development, there was little hope that the range and endurance of the XB-51 would improve sufficiently to meet the night intruder loiter time requirements. The XB-51 was not set aside quickly, however, for it incorporated many features to its advantage for a tactical bomber. These included single point refuelling, rebombing in nine minutes, rearming in 15, and low footprint weight, allowing it to operate from hastily-prepared airfields. In combat configuration it could operate if need be from 6,000ft runways at sea level, provided there were clear approaches. Its all weather characteristics appeared to be satisfactory. Despite being a dense airplane (crowded with actuating systems and other components) it was rated as being easy to maintain. In addition to its novel rotatable bomb bay door, it had pneumatic assist bomb release to assure positive release at high speeds. The small dimensions of the bomb bay however, severely restricted the load and ordnance varieties that could be carried.

From a defensive standpoint the level flight speed of .89 Mach below 30,000ft for the XB-51 made interception by then present-day fighters in the F-86 class extremely difficult. Its armour protected engines, remotely mounted from the basic structure, fire extinguisher system and fuel tank purging was all highly regarded as reducing vulnerability to aircraft and ground fire.

When the evaluation board came to the North American B-45, they did not make a formal investigation, as time was growing short and several on the team had flying experience in it as a TAC bomber. The Tornado had been around for several years following its first flight in March 1947, and more data was available on it than any of the other entrants. In general, those who flew it felt that the handling characteristics of the B-45 were satisfactory in the high speed range which was limited to .77 Mach, but the three Gs at that speed imposed a limitation on manoeuvrability. In the speed range of 250–300kts IAS, it was a nimble airplane for its size and considered capable of performing the night low level work satisfactorily. It had a surplus of loiter time available in which to survey the target area for interdiction work at



the lower altitudes. While existing models were not equipped for gunnery or rocketry, a number of simulated attacks had been made in the B-45, and it was considered satisfactory for that type of work.

The Tornado had a great number of good features that matched the night intruder 'yardstick'. Unfortunately, its design was based upon World War II concepts and it was already the oldest of the types being considered. It was really too big and too heavy to be well suited to this role. However, as a stop gap measure for the Korean War, the committee did make the recommendation that existing B-45s in the TAC inventory be transferred to the night interdiction mission for the calendar year 1951. This was never done, however. Perhaps the reason was that at this time, heavy combat losses were being experienced in Korea with the few reconnaissance versions of the B-45 that were deployed there.

Armed with these evaluations of the five airplanes (some of which are shown in Appendix 1), the committee submitted their findings to a Senior Board of Officers on 15 December 1950. Instead of one, they picked two bombers as having potential in the night intruder role; the Martin XB-51 and the English Electric Canberra. Their proposed plan was to purchase immediately Canberras from England as an interim airplane to equip two of the contemplated four light bombardment groups of the newly restructured 95 Wing Air Force. This would allow time to produce the Martin B-51 to equip the remaining two groups, then to re-equip the first two Canberra groups with B-51s as well.

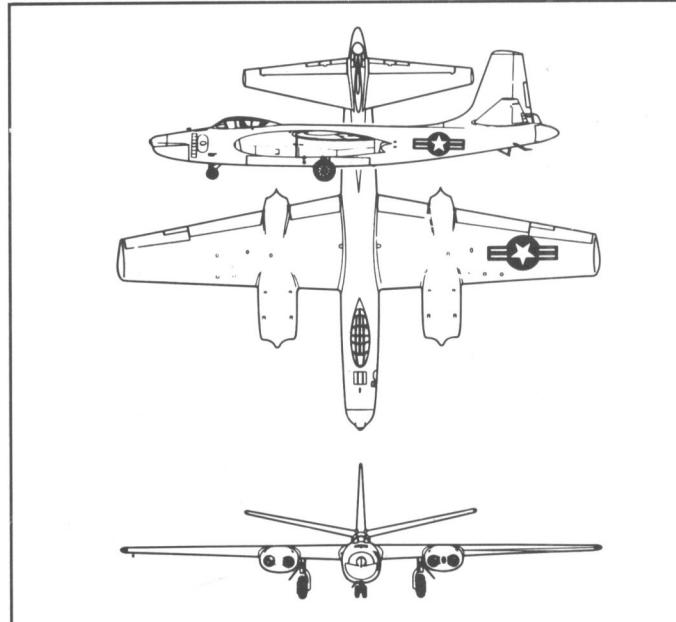
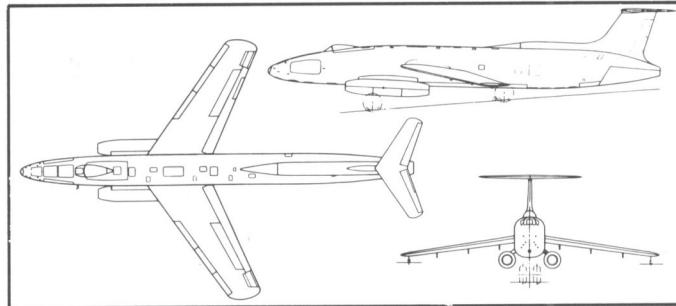
This recommendation was short lived, for the Senior Board did not agree fully with the way the evaluation yardstick was applied to available aircraft and believed that the AMC

Above: Martin's entry, the XB-51 is shown just after take-off, with gear and flaps coming up. XB-51 was unusual in that its wing could pivot on the fuselage to increase its angle of incidence when the wing flaps were extended. This was necessary because of the bicycle type landing gear that prevented the aircraft itself from making a pitch change angle for take-off.
/Martin

Above right: The tri-jet XB-51 incorporated a drag chute for emergency short field landings, a feature so well liked, that it was recommended to be included in the American built Canberra. The proposal proved unnecessary. Note the slight aileron and massive landing flaps on the XB-51. Spoilers were primarily used for lateral control.
/Martin

Centre right: Martin XB-51.

Bottom right: North American B-45 Tornado.



committee was prejudiced in favour of the B-51. They fully recognised that the B-51 was nearly 100kts faster than the Canberra, but the British bomber was far superior in flight endurance. The Canberra with its two 6,500lb thrust Rolls-Royce Avon engines allowed it to loiter for approximately two and a half hours over a target 780nm from its base. The B-51 even with future engines could loiter but one hour over a target 350nm from base. Concern was also expressed that the wing tip wheels on the B-51 would prove troublesome at hastily prepared forward bases, while the Canberra was best suited to this environment over all aircraft considered. Of importance also was the fact that the Canberra was the only light jet bomber contemplated for use in the then-current NATO (North Atlantic Treaty Organization) programme of which the US was a key member.

The board could not unconditionally recommend procurement of the Canberra above all others until it obtained more information from the British as to their ability to supply, over their own needs, 300 aircraft which would make up the four US bomb groups. Should the Canberra become available at an acceptable rate, the board was very much aware that there would be a number of modifications necessary before it could fill the role of a night intruder bomber. Also recognised were the inherent problems of stocking and maintaining components of English measurement standards for replacement items, and using British type accessories. This would create a logistic problem, for all support would have to be established as a system separate from normal USAF supply channels. This uncertainty of purchase, the many modifications needed, the failure generally of the airplane to meet USAF standards, indicating the

probability of operational problems, further confused and prolonged the issue before the selection board. Thus, for a more critical and penetrating evaluation they requested the immediate loan of one completely equipped airplane to be brought to the United States. The RAF agreed and one Canberra was set aside for the flight to the United States.

While awaiting these final tests, the question of airplane availability, should the Canberra be selected, became a major issue with the board. Lt-Gen K. B. Wolfe, Air Force deputy chief for materiel, and a group of AMC officers visited England to obtain first hand production data. They soon learned that the British were willing to supply the Canberra to the United States, but deliveries could not be accomplished at a suitable rate for the USAF and still meet RAF commitments. A cost was quoted at \$1,474,000 for each of the 300 Canberras that were to be contracted for.

An alternative for meeting production needs and the factor that saved the Canberra for the Air Force, was British willingness to grant manufacturing rights of the Canberra to the United States. However, with this prospect of major US production involvement, Gen Wolfe and his group warned that the Canberra did not meet Air Force aircraft standards and that much of the proposed modifications necessary for US production would entail serious problems. Since the Canberra was built to the British system, an entire redesign to US standards would be necessary. It soon became apparent, however, that this was the only solution should the

Canberra emerge as the winning choice. Anticipating US production, the board recommended that a contractor be selected to manufacture the Canberra in the US.

The Glenn L. Martin Company was approached with the proposal to build the Canberra for the USAF should the XB-51 lose in the selection as a tactical bomber. They willingly agreed, for this assured them a much needed contract in either case, though it was evident they preferred to build an airplane of their own design. It was during this period of indecision that the designation 'B-57' was assigned to the Americanised version of the Canberra bomber. When the long-awaited decision making day in February 1951 finally came as the first Canberra arrived at Andrews AFB, members of the Senior Officers Board, Headquarters USAF, TAC and ADC were on hand to appraise the new bomber. On 26 February, the ground and aerial comparison between the vying aircraft types took place, and shortly thereafter the final decision was made. 'The Canberra,' the official board report noted, 'comes closest to filling the night intruder profile because of its excellent characteristics of endurance, range, manoeuvrability, and the visibility provided from the nose section.' Thus, on 23 March 1951, a letter was sent to the Martin Company requesting that 250 'B-57As' be manufactured to fill the night intruder bomber role for the US Air Force. The US had purchased and was preparing to manufacture its first foreign military designed aircraft in 35 years, dating back to the SE5 and De Havilland DH4 of World War I vintage.

Below: The B-45 had excellent crew accommodation. Its main drawback was the restriction of forward vision for the co-pilot by the front pilot's ejection seat, due to the tandem arrangement. Crew of four was carried, including a gunner in the tail compartment armed with two .50cal machine guns.



Canberra— B-57 Comparison

My first close look at this new airplane came at Langley AFB, Virginia in October 1954, when O. E. 'Pat' Tibbs, director of flight and Chief Test Pilot for The Glenn L. Martin Co, flight demonstrated the B-57B to our unit. This aerial exercise was far more spectacular than the one given at Andrews AFB in February 1951, the one which clinched acceptance by the USAF of the Canberra design. Tibbs was not confined to a set or timed demonstration as was the case at Andrews, and the broad range of speed and manoeuvrability of the airplane was unbelievable unless seen. That afternoon, following the morning demonstration, Tibbs held an introductory and background briefing about the development and flight characteristics of the B-57. This evolved around his flight testing of the English Electric Canberra that was initially on loan to the Martin Company for that purpose. Reading from prepared notes, Tibbs' captivating and dry-humoured story began to unfold:

'Reaching approximately 30,000ft with the Canberra, I increased the speed until it reached .83 Mach. At this point, because of

severe roughness, I decided to discontinue further investigation of speed as I was somewhat dubious about the British method of determining limit buffeting values. It seems to me that probably it was based on the point just before the airplane completely disintegrated.'

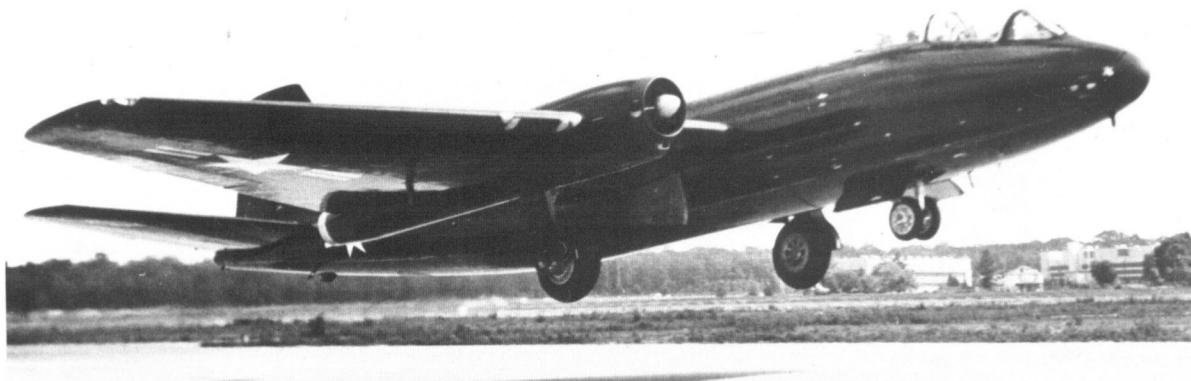
Pat's briefing went on after our uneasy laughter, covering our concern, had subsided: 'Now, the B-57 aircraft you see on the line and that you saw flying this morning resembles the Canberra I just described when I evaluated it in 1951. But believe me, gentlemen, there is no resemblance in the performance today of the two aircraft as far as the high speed characteristics are concerned.'

The difference was not by accident. Originally, when the Air Force purchased the design rights of the Canberra, they had felt that little or no time for further aerodynamic 'clean-up' of the Martin-built product would be needed to match the *stated* performance of the British Canberra. However, with the advent of jet engines, the time had come where power out-

Below: One of the finest demonstrations of the Martin B-57B to crews who were to fly them took place at Langley AFB, Virginia, on 11 October 1954. Author Bob Mikesh is in this group about to have a closer look at the Canberra following its aerial demonstration. At this point, the Canberra was still a curiosity with members of the 345th Bomb Group, for it was several months before the new bomber was assigned for operational use.



put was exceeding the structural capabilities of airframes. In the case of the B-57 and British Canberras, if left at full throttle, especially at the lower altitudes, the airplane would reach a speed where it would disintegrate in a matter of a few short minutes. This point was being met at a low Mach number because of air flow buffeting before the aircraft reached the stipulated speed limitations, and the consequences did not augur well for the new Canberra. The British tried to cure this roughness at high speeds by increasing the strength of the fuselage skin. Tibbs jokingly described that approach as 'merely armour-plating it, mainly just so they could live with the roughness.' But there was underlying concern in his voice. The cause of the problem had to be detected before the right solution could be made. In tight formation with another B-57, Tibbs watched the lead aircraft as they approached and exceeded .81 Mach at 40,000ft to see where the trouble might be. The test aircraft had been provided with a series of strings or tufts secured along the skin to visually indicate areas of turbulent air. By the gyrations of the tail, the problem area was obvious. 'I couldn't help but wonder how much of *that* an airplane would withstand before tail feathers would begin to part,' Tibbs



Top left: Seasoned Martin test pilot O. E. 'Pat' Tibbs demonstrated the full operating limits of the Canberra is such a way to make any sceptic take notice. Everything about Tibbs with test flying was professional, and if Martin built it, 'Pat' flew it first. Demonstrations were not 'air shows', but merely to show the reliability and capability of the airplane. They were still spectacular!

Above: The short field take-off capability for the Canberra was impressive for any bomber. Flight demonstrations were often without wing tip tanks and a light fuel load, making the take-off distance less than 2,000ft, depending on wind and temperature. In this picture taken just after breaking ground, the wheels are already beginning to retract.

Top right: Following the morning flight demonstration and a well-earned shower, 'Pat' Tibbs discussed in great detail with future Canberra flight crews, the handling qualities of the B-57. Of interest to most listeners was his description of differences between the British-made Canberra and the Martin B-57. This was the briefing room of the 500th Bomb Squadron at Langley in October 1954 at which the author was in attendance.

Right: Following the morning flight demonstration and a well-earned shower, 'Pat' Tibbs discussed in great detail with future Canberra flight crews, the handling qualities of the B-57. Of interest to most listeners was his description of differences between the British-made Canberra and the Martin B-57. This was the briefing room of the 500th Bomb Squadron at Langley in October 1954 at which the author was in attendance.



continued. 'I loosened up my formation as a matter of self-preservation while we came back on our airspeed!'

A temporary fix was tried by covering and wrapping all the openings in the tail and aft fuselage section with tape. In the case of the B-57 design, it had an adjustable stabiliser used for trim. To allow for this movement, a large open slot at the attachment point to the fuselage was necessary, and this was the area of most turbulence. Air was going in through the fuselage members, reversing, and so forth, and was probably causing the trouble. A second flight test was made which revealed a marked improvement. All B-57s were then equipped with snug-fitting covers for these gaps, yet free movement of the stabiliser was allowed. Aft fuselage bulkheads were also sealed to further resist free passage of air in and around the inner structure. This was acclaimed as the greatest contribution by the United States to aerodynamic design improvement for both the British as well as the American built Canberras.

The obvious question was often asked at the conclusion of most of 'Pat' Tibbs' briefings: 'What differences did you note in comparing the flying characteristics of the British Canberra with that of the initial B-57As which were hardly distinguishable from the British counterpart?'

Prepared with an answer, Tibbs often started like this:

'Due to the Americanisation, many think we have lost much performance over the British airplane. They usually indicate that they are sure we have installed a lounge, a bar, a ready room and so forth aboard, which would completely ruin the airplane. Well, let me say right now, nothing could be further from the truth. I can detect no difference between the two aircraft in take-off, climb out, cruise, etc – no changes. At first ours was just as rough, if not more so, as theirs until cleanup. Control forces are slightly lower on the B-57s than on the Canberra. This very desirable condition probably stems from a better aileron sealing job obtained in converting from British to American standards, plus the fact that the three control surfaces – elevator, aileron, and rudder – have slightly lower spring rates in the tabs.'

'The greatest advantage with our airplane was the Martin rotatable bomb bay door. The Canberra has a speed limitation of 350kts IAS for opening its bomb bay, even though the doors slide up inside the fuselage. Ours could be opened at its maximum indicated airspeed of 500kts IAS with no adverse effect. In general, the performance of the B-57 is equal to or better than the English Canberra in every category that we have tested up to this time (1954).'

Production and Setbacks

In order to reach this point in the development of the B-57B that was just demonstrated at Langley, many transactions took place over the preceding three and a half years following the Air Force acceptance of the Canberra design. On 9 March 1951, the Air Materiel Command (AMC) implemented the Canberra procurement and production programme by authorising the purchase of an initial quantity of 250 Canberras with FY 1951 funds. A licence agreement between the two companies was consummated on 3 April 1951, covering the manufacturing and sale and use of the Canberra and spare parts solely in the US to and for the Government. Royalties were not to exceed 5% of the selling price of the airplanes at fair market values.

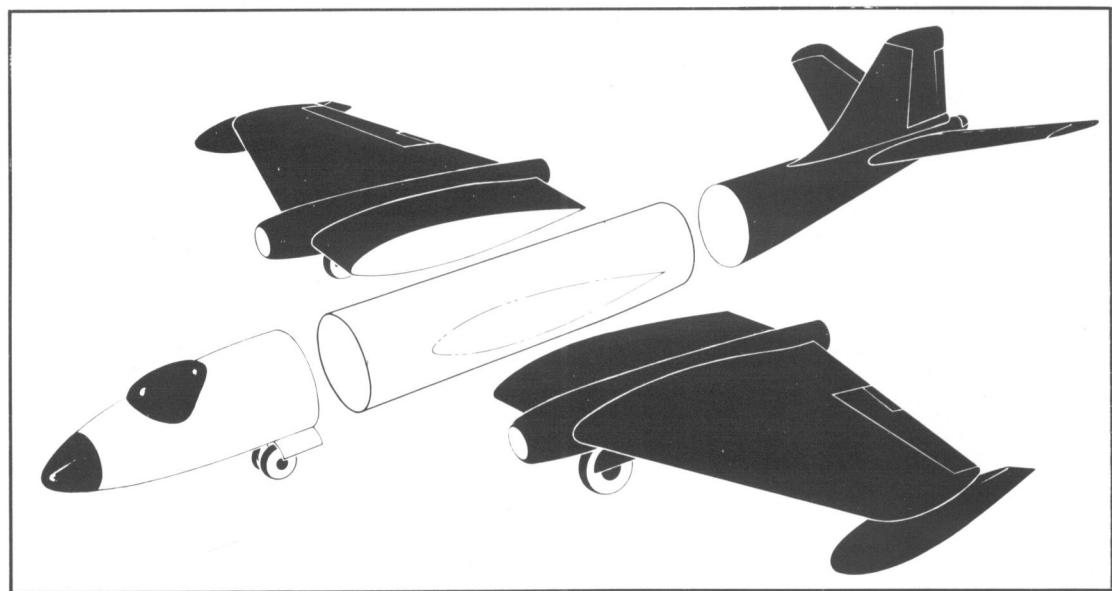
To assist Martin in production, five sub-contractors were to produce about 60% of the airplane by airframe weight. Kaiser Metals was to build the two wing panels and nacelles, as well as the rotating bomb bay doors. Hudson Motors furnished the aft fuselage section and the tail components, while Cleveland Pneumatic Tool Co supplied the main and nose landing gear. Other sub-contracted

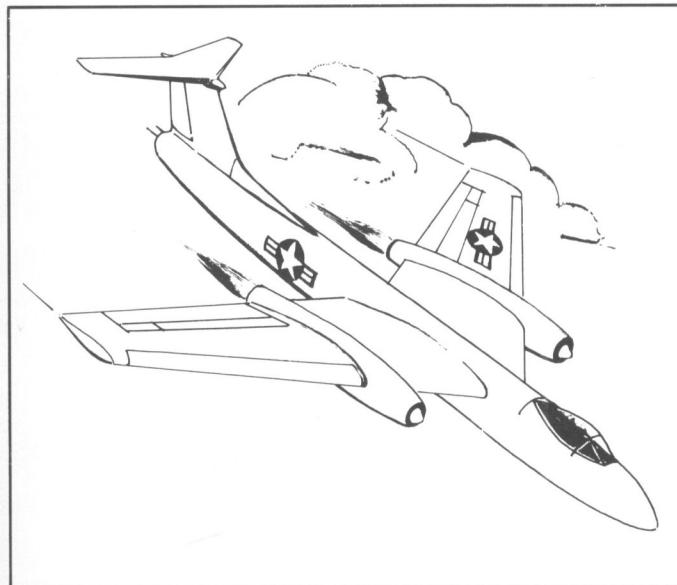
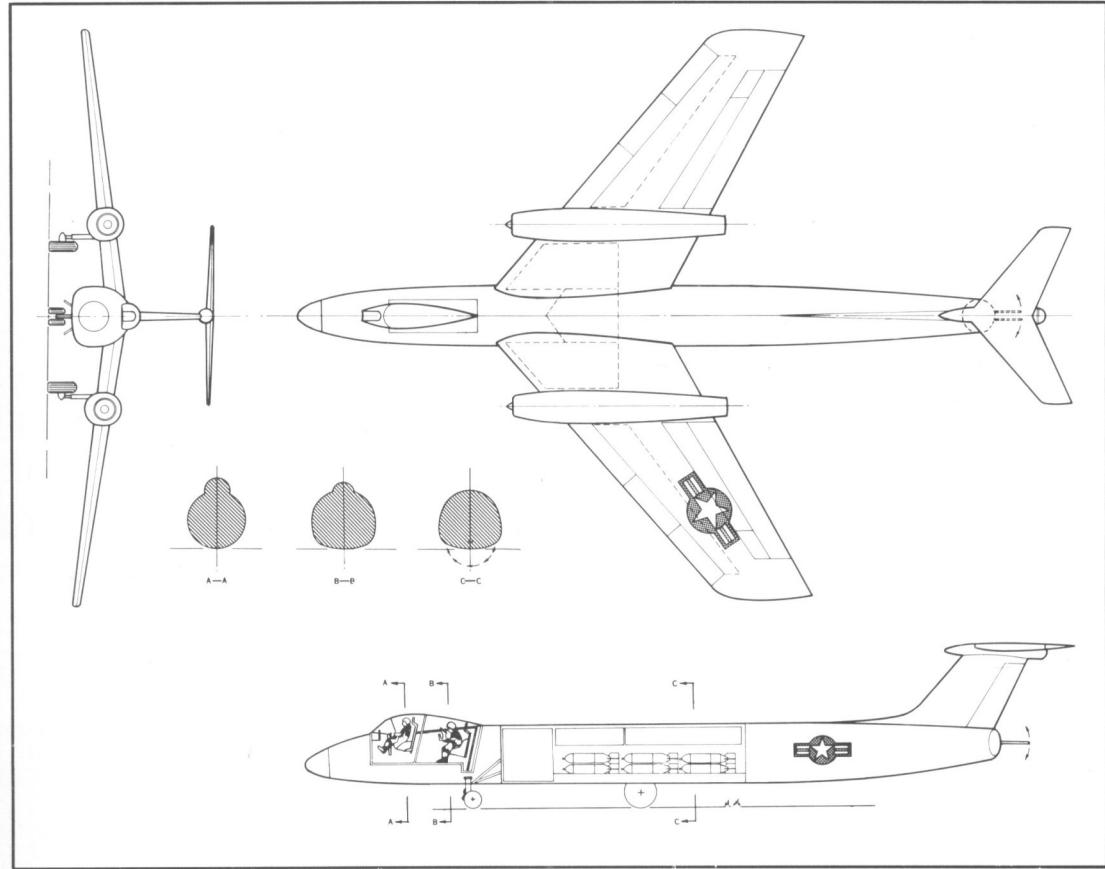
items included the canopy and nose cap, tip tanks, fuel cells, forgings and castings, ejection seats, hydraulics and electrical equipment. The engine was an American adaptation of the Armstrong Siddeley Co Ltd Sapphire engine having 7,200lb st. This was a more powerful engine than the 6,500lb st Rolls-Royce Avon that powered existing Canberras, but the extra thrust would be needed for the anticipated added weight of the B-57. Wright Aeronautical Corp paid \$499,800 for manufacturing rights to build the J65 Sapphire engine. Buick Motors Division of General Motors Corporation, sub-contracted and initially produced the engine for the B-57s.

The first Canberra drawings arrived from England on 1 June 1951 and work began immediately on the conversion from British measurement standards to those of American standards and related equipment. This entailed a tremendous redrawing job, for the Americans used different gauge sheet metal standards, rivets, bolts and screws, and the best compromise had to be determined in each case. Manufacturing tolerances in production methods were also a major consideration.

Below: Diagram gives an idea of the extensive subcontracting on the B-57 as indicated by the shaded components. Nearly 60% of the plane by weight was to be built outside the Martin plant. Kaiser Metals fell short of its wing production and their work had to be accomplished by Martin. Hudson Motors built the aft fuselage and tail section. There were five sub-contractors in all for these major components.

Right: Proposed B-57B Super-Canberra was never built mainly because it was virtually a new design and would have taken too long to put into production. Borrowing many features from Martin's own XB-51 as well as the Canberra, it promised much better speed and performance.





Instead of being required to hand-tailor details in assembly to $\pm .020$, $\pm .005$, the tolerances were increased to $\pm \frac{1}{32}$ in. This in no way affected the quality since outside mould lines were still maintained in final assembly. Aside from production method changes, there were inherent design changes that had to be made. To what limits this should be carried was a sensitive subject that persisted for many months, for prerequisites made upon the Air Material Command when accepting the Canberra for the USAF was that it would be built 'as is' with minor exceptions. Major changes would increase costs and extend production delivery schedules and the urgency created by the Korean War could not tolerate this. On the other hand, this 'no significant change' policy generated considerable doubt and apprehension among certain Air Force agencies, particularly the newly implemented Air Research and Development Command. Their mission conflicted with the selection criteria of the Canberra 'as is,' and although the research and development agency was responsible for the technical excel-

lence of Air Force aircraft, its hands were tied in the case of the B-57. They determined that 'the Canberra fell far short of meeting existing USAF requirements and will require major redesigning to be brought up to what could be considered satisfactory.' Thirty-five deficiencies were listed, but to stay within the guidelines of the purchase of the airplane, only six of these were corrected. Many felt – and rightfully so – the aircraft's usefulness 'as is' within the USAF would be extremely limited and could only be considered an interim measure until a suitable design could replace it.

The Martin Company, at the request of the Wright Air Development Center, recognising this frustration, which they too shared, offered to Headquarters USAF an entirely new design for a tactical bomber and night reconnaissance airplane. The new proposal was called the B-57B Super Canberra. In general, the new design was a combination of the best features of the XB-51 and the B-57A. Flight experience gained from the XB-51 provided a sound footing upon which Martin was able to develop this proposed high performance tactical bomber. Basically, the Super Canberra was a swept wing design, retaining low wing loading and embedded engine nacelles like that of the Canberra. Improved Sapphire

engines with afterburners would provide a total of 21,700lb of thrust at take-off and a maximum speed of 630kts at sea level. Fuselage diameter was the same as the Canberra and its T-tail was a carryover from the XB-51. The crew of two sat in tandem under a single teardrop canopy, while photo reconnaissance and ECM missions could be accomplished with bomb bay package conversions.

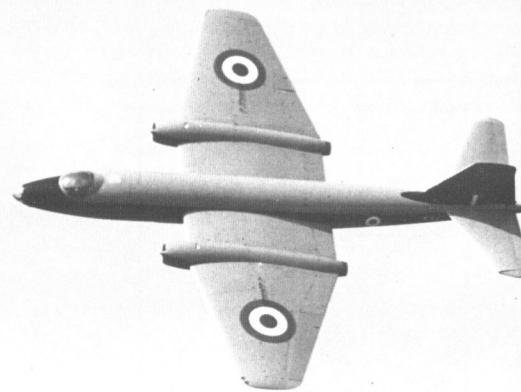
Martin's engineering report of 14 September 1951 claimed that production airplanes of the Super Canberra could be available for service during the calendar year 1954. However, a new and unproven design is what the aircraft selection board wanted to avoid, and by November 1951, the Super Canberra proposal was rejected. In the meantime, flight studies continued with the Canberra that was on bail to the United States from the RAF. Following its arrival at Andrews AFB in February 1951 for the final evaluation and bomber selection, this Canberra B2, WD932, was flown to Langley AFB, Va, for members of Headquarters TAC to have a look at their future night intruder bomber. From there it went to Wright-Patterson to be inspected by AMC before being flown to the Martin factory at Baltimore.

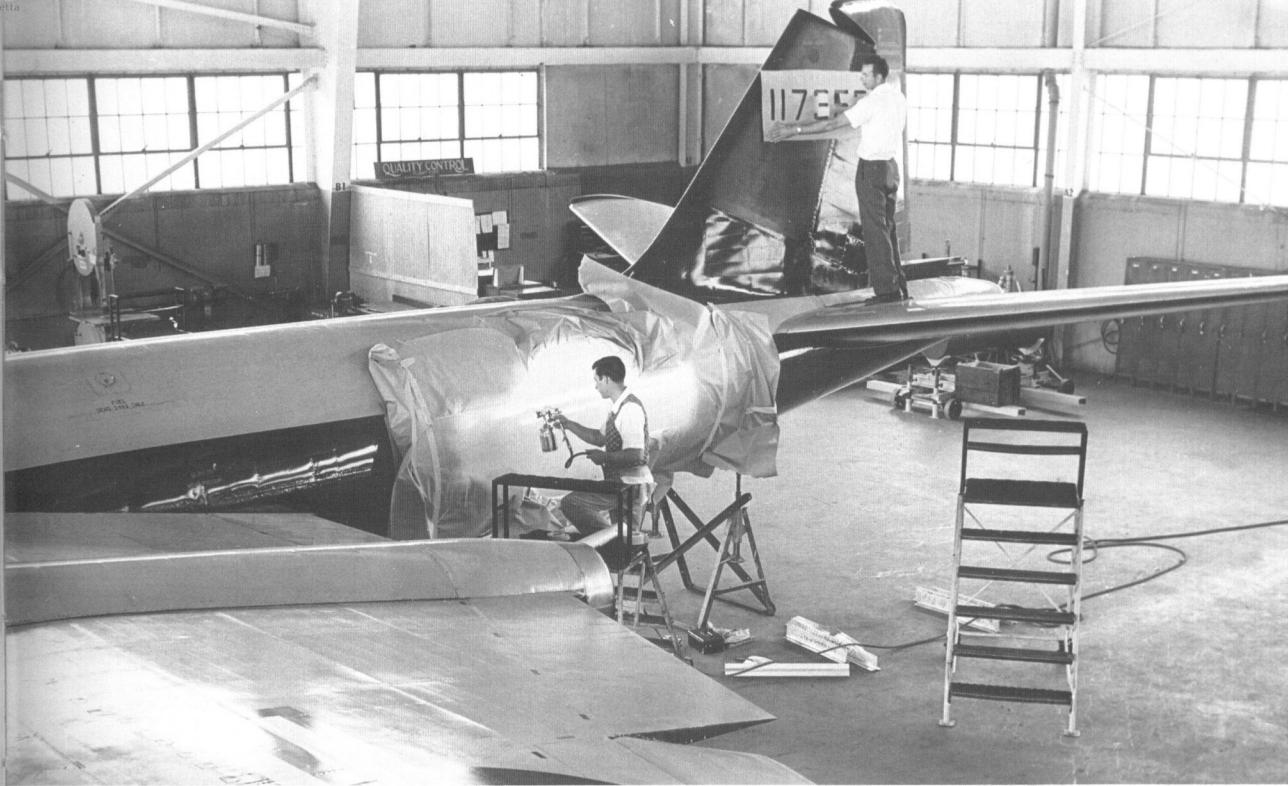
Pat Tibbs made the delivery flight to Martin's Middle River, Maryland, facility

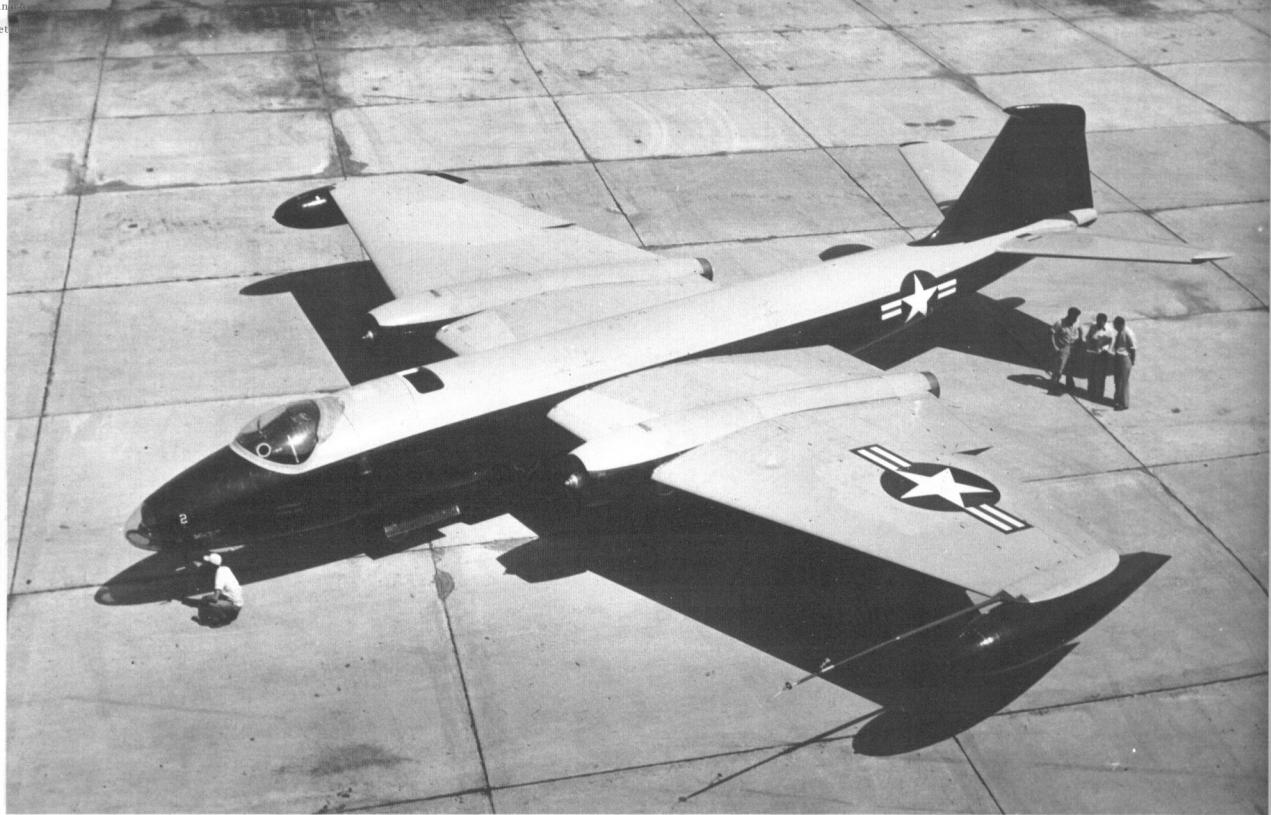
Below: Martin employees watch expectantly as their Chief of Flight Test, 'Pat' Tibbs brings the Canberra 'home', where production will soon begin at this Baltimore plant. Martin had hoped to build their XB-51 for the Air Force but the Canberra contract was better than no contract at all. British markings stayed on this aircraft for the several months of test flying while it was on 'bail' to Martin./Martin

Right: At a cost of \$1,018,388, Martin purchased two Canberra B2s from English Electric, and the money was reimbursed to Martin by the USAF. WD932 had crashed by the time this transaction was completed and WD940 was the only one of the two to have its serial number 117352 applied to its fin./Martin

Below right: The first step in re-marking the US Government owned Canberra was to remove the RAF roundel and apply US national insignia. This pattern is not a paint mask, but merely served as a guide around which to apply masking tape./Martin







Above: Rolled out from Martin's paint shop, RAF WD940 is now USAF Canberra 117352. B-57 designation was not used with British built aircraft. Probe on left wing tip is yaw indicator for flight evaluation only. Open hatch leads into upper electronic bay, forward of the main fuel cell. The number 2 painted on the nose was Martin-applied to distinguish between the two Canberras while both were at the Martin factory.

where the B-57 would be built. Before leaving the plant for the pick-up of the airplane, Chet Pearson, president of the company, made these parting comments to his Chief of Flight Test. 'Pat, if you like the airplane at all, do a slow-roll or something across the field when you return. We all will be waiting. The morale is pretty low here for us, having designed our own plane, yet have to build a foreign design.'

Tibbs liked the airplane, and by the time he reached the Martin airport, he was confident of its feel and manoeuvrability. He gave the folks at Martin what they wanted – and then some. Ten feet off the deck, Pat brought the Canberra across the field at 400kts indicated. At the far end with the roar of sound that just reached the spectator's ears, he pulled it up steeply and went into an aileron roll. On its back during the roll, there was a sudden silence as both Avons flamed out – and for the next few minutes the Canberra was a high speed glider. Fortunately the light fuel load remaining gave Tibbs the time needed to get both engines re-lighted, after which he gingerly brought the plane around to a conventional and graceful landing. Cool thinking, with complete knowledge of the equipment, and having the situation always in hand is the prime ingredient of a competent test pilot like Tibbs. Few besides Tibbs were the wiser about what had just taken place and the people

at Martin were a bit happier at building the English Canberra.

By June of that year, the need for a second Canberra was recognised, and approval was given by AMC to Martin for the purchase of the loaned aircraft at hand, and one yet to be delivered, at a reimbursable cost of \$1,018,388 for the two. The arrival of the second Canberra B2, WD940, from its North Atlantic crossing on 31 August 1951, generated more interest than the earlier crossing of WD932. This second airplane established an official time record from Aldergrove to Gander of 4hr 18min which averaged 481.1mph over the 2,072 statute mile route. Beaumont, of English Electric, who had performed the flight demonstration at Andrews AFB six months earlier in WD832, was in command for this crossing. With Beaumont were navigator D. A. Watson, and radio operator R. H. T. Rylands. On 4 September 1951, this second Canberra joined the first at Martin for the Combined Test Project Agreement between the USAF and the RAF which called for the exchange of aircraft development information.

WD940 was the 12th production B2, and the 21st Canberra to fly. After nearly a year at Martin, WD940 had its insignia changed from that of the RAF to US markings, but retained its light gray upper surfaces and black lower surface camouflage. Across its tail was



Left: This striking picture is of the re-marked English Electric Canberra to illustrate the new USAF bomber to be produced as the B-57 night intruder. The morning sun reflects on the Chesapeake Bay, and the nearly completed Bay Bridge in July 1952. The bridge, dates the picture for this vital link to the Delmarva Peninsula is now a double bridge system.

Below: The former RAF Canberra WD940, before it received its USAF markings shown here, was the holder of the record for an east-west transatlantic crossing - 4hr 19min, from Aldergrove, Northern Ireland, to Gander, Newfoundland, on 31 August 1951. Eventually this airplane was used by subcontractors for patterns.



painted its 1951 assigned Air Force serial, consisting of the numbers '117352', but it, like WD832 were directed to retain the identity of 'Canberra' and not classed as 'B-57'. Tests made with this Canberra were limited to four 48,000lb max gross weight take-offs to simulate the initial gross weight to be designed into the B-57A. These heavy-weight take-offs could not be performed on the first aircraft because of its wheel and brake limitations. When WD940 ended its last flight and was placed in storage, its total flying time was 33hr, of which Martin pilots flew it for only three of those hours. Eventually the landing gears were interchanged between the two airplanes so the earlier and more fully instrumented WD932 could handle the remainder of the flight test programme.

Martin pilots flew the first Canberra, for 41hr out of its total 86hr as of 15 October 1951. It retained its RAF insignia throughout the test programme and its Air Force serial number (51-17387) was never applied to its fin. The reason for the number not being applied was that it had not been assigned until after the plane had been destroyed and was then belatedly paid for.

Tragedy struck the Canberra project when this airplane, WD832 crashed while on an evaluation flight just before Christmas 1951. On 21 December, during a tight turn analysis at 10,000ft, the left wing failed just outboard of the engine nacelle. The airplane crashed near Centreville, Maryland, on the Delmarva Peninsula, 25 miles south-east of the Martin factory. Both crewmembers ejected, but the engineer-observer's chute failed to open, and he was killed. Air Force test pilot Maj Harry N. Lister received minor injuries.

Investigation revealed that structural failure had occurred when the pilot was pulling 4.8Gs at 420kts at the aft cg limit of the aircraft. This was within the design limits and nothing should have failed. It became apparent that the G force was greater than the indicated 4.8Gs, over-stressing the wing, or else the aircraft had broken prematurely. While the investigation into the cause of this accident was underway, it provided the leverage needed to make design changes in the B-57A design. There was little doubt, though unconfirmed, that escape from the aft navigator's station was critical as was suspected through this fatal accident.

In January 1952, the Commander of the Wright Air Development Center, Maj-Gen F. R. Dent took a positive stand on the shortcomings of the Canberra design for use in the USAF. In a letter to his command headquarters, he noted no less than 31 design deficiencies, pointing out that if all could not be eliminated in the existing design there would have to be a major redesign of the airplane. To reinforce his stand, General Dent enclosed a document which the British Ministry of Supply sent to the English Electric Company. This contained a long list of flaws which had to be corrected before the Royal Air Force would accept the airplane. The general noted that the British deficiencies '... very closely correspond to those outlined by WADC in presentations prior to the Headquarters, USAF letter directing production of the B-57A.' Furthermore, the general continued, 'It appears inconsistent that we should accept these same deficiencies in the production model of this airplane for use by the USAF.'

Below: The setting sun did not halt production of the B-57, spurred on by the war in Korea. Two work shifts were employed by Martin, until the first four bomb groups were outfitted. RB-57A in foreground is being towed to the paint shop for its coating of anti-searchlight black paint, while B-57A, ship No 5 (52-1422) at left, already has its markings and was left in natural finish./Martin



Developing the Night Intruder

With further study of the problem facing the success of the B-57A as a successful night intruder bomber, AMC recognised that there did exist an incompatibility in producing the airplane 'as is'. Although production was already under way, Martin was asked to re-engineer the problem for consideration and approval. What resulted from this study was the B-57B, incorporating modifications to the basic Canberra design. This was a second use of the designation since the earlier concept of the 'Super Canberra' no longer existed.

On my first visit to the Martin plant to have a look at the mock-up of the newly designed nose for the B-57B, I felt immediately that this version of the Canberra was genuinely an American airplane. I remained sceptical of the wide chord, low aspect ratio wing which was not comparable to any other airplane of any other nation. The wing imbedded engine was not duplicated in any other American jet and we who were to fly the B-57 had some reservations about this. Engine failures and fires could cause disastrous wing structure damage, but very few aircraft were lost through causes that might be attributed to this design feature.

The new cockpit arrangement, though weighing 387lb more than the original, was a remarkable improvement for the pilot. (Little did I suspect then that I would spend over 2,000 flying hours under this type of canopy!) Visibility needed for the ground attack phase of the bomber mission was nearly unrestricted in all directions. Of equal importance, it moved the navigator from the deep compartment behind the pilot with only one small window on the port side, to a position where he could see out of the airplane.

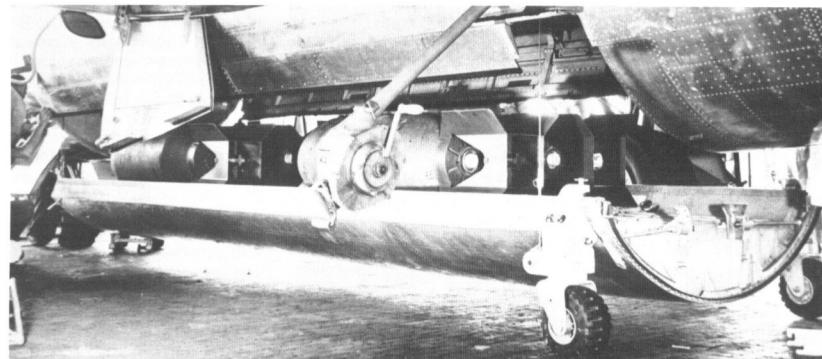
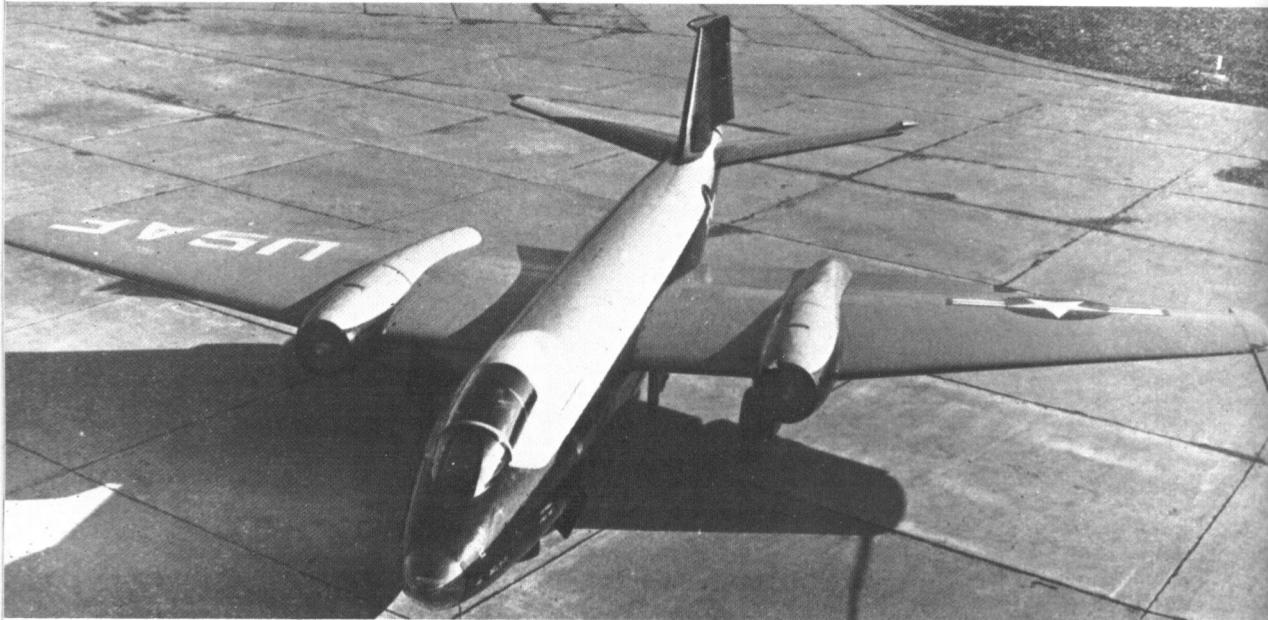
This new canopy - formally requested of Martin in May 1952 - was essential to correct a deficiency that was overlooked when the Canberra design was first selected. The original double curved layers of glass would flex with changes in temperature and pressure, especially during the ground attack phase of the mission. It therefore became impossible to place a gunsight behind this canopy and have proper harmonisation with the guns for acceptable accuracy. This sight had to be placed behind a flat glass panel.

The second British Canberra to be received, WD940, was used to work out these new bomber-version features. It was modified with this new cockpit arrangement which also required the moving of flight controls and pilot position from the off-set left of centre, to the centreline location. If WD940 was ever flown in this configuration, it is not known. If it had, it did not make an impression on 'Pat' Tibbs who would have flown it after being modified. WD940 was then made available to sub-contractors for inspection of the components they were to make, and later was allegedly moved to the museum yard at Sampson AFB, Geneva, NY where it was later scrapped.

The new 'B' model was to have another improvement feature - speed brakes at the waist position of the fuselage. It was learned from the earlier design, that although unusual, the finger-like spoilers, or wing dive brakes (as they were technically referred to) on the top and bottom of the outer wing panels did not provide sufficient drag for speed control. At the high operating altitudes, idle power settings retained a higher rpm with resultant high thrust in the thin atmosphere.

Below: Mock-up of Martin's redesigned nose section is evaluated closely by Wright Air Development personnel. This model became known as the B-57B, its cockpit reflecting American styling throughout. This redesign was necessary in order to provide a windshield with flat glass behind which to place a gunsight without having distortion due to temperature and pressure changes. *[Martin]*





Since cruising speed at high altitudes was equal to maximum allowable, reducing power and extending the wing dive brakes, had only minimal effect. The let down from altitude became tedious and time consuming so as not to exceed the airspeed red-line. These wing dive brakes were retained and worked in conjunction with the controls for the fuselage speed brakes. In the ground attack role, the speed brakes would be very useful for controlling acceleration in diving passes.

A feature often overlooked in marking the success of the B-57 tactical bomber is its rotating bomb bay door. This one piece, 17ft long door was mounted on two pivot points. It could open in four seconds and close in six, making a 180deg turn. The bombs were attached directly to this door, and in the open position the bombs would be in an externally mounted position. This kept the bomb bay

cavity sealed or closed, therefore causing no buffeting or pitch change generally associated with conventional bomb bays, and open doors that often affected bomb dropping accuracy. This eliminated any door opening speed restrictions, which was at 350kts for the British Canberra. Developed first on Martin's XB-51 and carried over to the B-57, this door innovation was invented and patented by two Martin Armament Engineers, Albert T. Woollens and Werner Buchal. In addition to its performance advantages; the removable doors could be pre-loaded at a remote site, then towed on its own detachable wheels to the airplane for a quick mission turn around. No one recalls this loading procedure actually used in combat zones however.

Features of this door contributed to the B-57 becoming the most accurate special weapon delivery aircraft through the 1960s for

Above: Former Canberra WD940 was modified by Martin with this new tandem canopy for engineering study and was possibly used for flight evaluation. This led to the B-57B. The clear forward nose section was left unchanged for this evaluation. This elongated canopy adds even slimmer lines to the Canberra. *[Martin]*

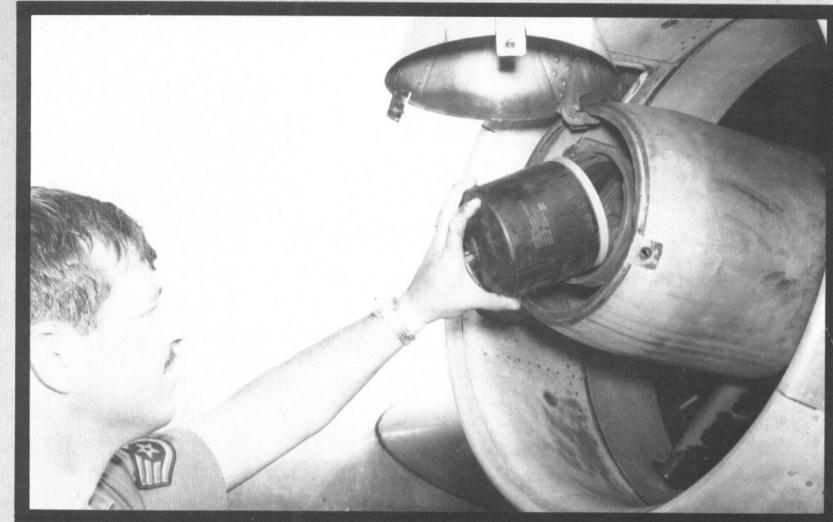
Left: Bombs can be pre-loaded onto the bomb bay door and rolled to an awaiting B-57 for rapid turn arounds when carrying complicated loads. Four hand-held hoists lift door in place for attaching to its pilot points in bomb bay on which the door rotates 180° open and closed. Wheel dollies were then removed. *[Anderton]*

Right: The first B-57B shows off its new canopy and its improved cockpit vision becomes obvious. Windshield framing restriction to forward visibility was hardly noticeable. Overhead lines in rear canopy was antenna for ADF. When positioning the special ladder for crew access, it was aligned with the two 'U' shaped marks on the side of the fuselage. Flat black on leading edge surfaces was rubberized paint which resisted wind erosion. *[USAF]*



Right: Crew chief installs starter cartridge into starter breach. These are replaced after each start, and care has to be taken in loading to ensure a good electrical contact is made for igniting the cartridge. The starter and electrical contact points are inherently dirty due to the burning material.

Below: The engine start of a B-57 is immediately obvious by 10 seconds of black smoke that belches from the starter exhaust of each engine. The right engine is started first to build-up hydraulic pressure so that the canopy can be closed to protect the crew from the left engine starter smoke. Clean burning starter cartridges were later developed./USAF





the unique bombing system called LABS (Low-Altitude Bombing System). With no speed restriction for opening the bomb bay, this allowed a high speed entry for the manoeuvre close to the ground (about 50ft) at 425kts. With the door already open, a 3.5G pull-up was made at the target, and the special weapon was automatically released at about the 110deg position of the loop. The bomb continued up to about 9,000ft while the airplane was going over the top at about 5,000ft. This 360deg vertical-manoeuvre could be completed or an Immelmann-turn made at the top, depending on which escape direction was desired away from the target. Gaining speed again on the downward side of the manoeuvre at full power, the B-57 would be a considerable distance from the target before bomb detonation. B-57s were more accurate than any other aircraft for this type of delivery.

A Shoran bombing system operated by the navigator/bombardier was included, as well as a APW-11 Bombing-Aid Radar Guidance System for the pilot. For detection of other aircraft, an APS-54 Radar Warning System was included. Eight hard-points were added to the underside of the wings for bombs and rockets to be attached. Later models from the 91st B-57B/C on, carried four 20mm M-39 cannon, each with 290 rounds in the wings replacing the eight .50cal machine guns.

Some of the features that were recommended early in the Canberra programme that did not materialise were, wing surface and engine inlet anti-icing, anti-skid wheel brakes, drag chute for landing on short runways, power boost controls, centre-line mounted wing tip tanks (similar in design to those on

Above: For the production of the B-57, Martin moved back into their former government-owned World War II B-26 Marauder assembly plant No 2 across the road from their main facility. RB-57As are in various stages of production. Navy personnel served as customer and handled administrative matters for the US Government and USAF at the Martin plant.
/Martin



Above: Martin's Chief of Flight Test, 'Pat' Tibbs, climbs aboard the first Martin built Canberra for test flight at the Baltimore-Middle River facility. George Rodney at left went along as Engineering Recorder for the flight. 'First Flights' for Tibbs at Martin were nothing new. Flights of this nature went back to pre-World War II with Maryland, Baltimore, and every Martin type that followed./Tibbs

Top right: The first B-57A breaks ground in the early morning sun as the wheels are nearly fully retracted. Tibbs reported after this flight that the flying qualities of the Martin built B-57A were no different than that of the English Electric Canberra. First flight of the B-57A was 20 July 1953.
/Martin

Bottom right: The smile on 'Pat' Tibbs' face is proof enough that the first flight of the Martin B-57A went well. One recommendation was to improve the air conditioning system for prolonged low altitude flight, as evidenced by Tibbs' sweat soaked flying suit. The large plastic canopy trapped radiant heat and there was only limited, unfelt, outside ventilation./Tibbs

T-33s), and an AM-1 target avoidance warning radar, indicating to the pilot when minimum pull-out altitude was reached. Only on very rare occasions did I have need for any of these features, and their absence did not detract from the effectiveness of the airplane.

Of interest also on all J65 engine equipped B-57s was the unique starting system that used an electrically ignited single-shot starter cartridge. When fired, it burned for 10sec, directing its force against a starter turbine. This turbine drove the engine through a clutch linkage system and brought the engine up to starting speed. During the process, early cartridges emitted a dense black smoke, indicating to the uninitiated that the airplane was on fire. More than one of us got hosed down by the unsuspecting fireguard during early days of operating the B-57. The purpose for this method of starting allowed airplanes to be dispersed in a combat situation, doing away with heavy ground powered starting units, difficult to transport and maintain in out of the way places. What engineers overlooked however, was that the B-57 was designed with a liquid oxygen system. This system had to be recharged every 24hr or before each flight, and required a factory-like facility close at hand in which to generate the liquid oxygen.

When the design was approved for the B-57B night intruder configuration, the entire B-57 production schedule had to be revised. Since production was already underway for the B-57A, only eight would be completed, having slight alterations incorporated. No longer was this initial configuration expected

to perform the bomber functions. Components that were already on the production line for others were converted to the reconnaissance craft as RB-57As. These were to be limited to 67 in all, and now, reconnaissance production by necessity, was ahead of the bomber version. In order to adjust for the added engineering and retooling costs for the bomber revision, the total quantity of aircraft for the fixed price contract for FY1952, was reduced from 250 to 177 which set the figure in August 1952 at 102 B-57Bs, including spare parts, a mobile training unit and 103 special weapons doors.

The day every manufacturer awaits, finally arrived for the people at Martin on 20 July 1953. Just 28 months after the awarding of the Canberra contract, the first B-57A took to the air. 'Pat' Tibbs was at the controls and he later reported that the Martin airplane handled no differently than his earlier flights in the British Canberra.

Before a gathering of top Air Force officials and some of the nation's leading industrialists, the first B-57 was officially turned over to the USAF on 20 August 1953. In attendance was USAF Chief of Staff Nathan F. Twining who accepted the airplane after which Maj Roy Seccomb made the first official USAF flight. This event was unusual in that it took place at evening twilight, in order that visitors might better visualise the mission of the B-57.

Getting the night intruder into production did not end here for this first airplane, as 52-1418 was not a combat machine due to recognised deficiencies in its design. Already there were three models of the B-57 following it down the production lines. Owing to the



changes in production schedules it became a major problem to conclude a test programme of 'debugging' before B-57s became operational. General Boyd, Commanding General of the Wright Air Development Center, let it be known to AMC that the B-57 situation was beginning to resemble the B-47, F-94C and F-89 programmes, wherein these aircraft had been plagued by rashes of groundings, retrofittings, and openings of new modification centres. Generally speaking, Boyd continued, these situations could be expected when '... an aircraft is accelerated to quantity production without adequate lead time for testing or correction of deficiencies brought out by development testing.'

As the schedule then stood, test agencies would receive RB-57As in November and December 1953, with deliveries to tactical units slated to start in December. Following this, B-57Bs were scheduled for test delivery in February and March 1954, with the start of deliveries to operational squadrons beginning in March. As a result of this time compression, experience gained from the test programmes could not be incorporated into handbooks initially delivered to the using agencies. There was no 'XB-57' for these evaluations since the British version was already considered a proven design. The problem was somewhat resolved by its own accord in February 1954, when existing production schedules broke down because of Kaiser's inability to meet wing delivery schedules. To resolve the production problem, Martin assumed the unfulfilled contract and built the wing panels in their own facility. This provided some measure of relief to the



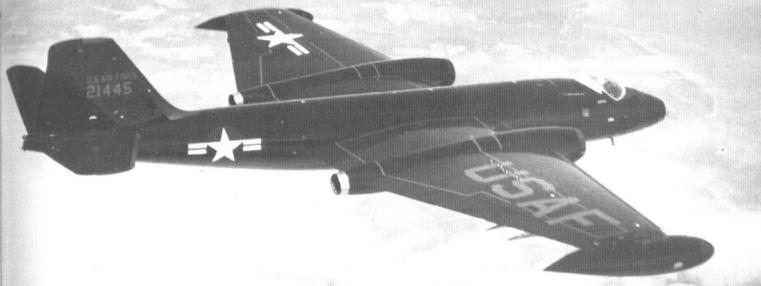
Above: Ship No 9, 426, the first RB-57A taxies out for acceptance flight in 1954. Last of the eight B-57As, 425, in silver finish behind, was instrumented for Shoran Bombing tests that were later conducted at Eglin AFB, Florida. None of the B-57As was considered combat aircraft./Martin

research command testing agencies because arrival at peak production rate of 20 per month was postponed from January 1954 to one year later, and delivery of the first B-57B was changed from February to July 1954. Contributing to production set backs was the slow delivery of the J65-BW-1 engines from Buick. Due to the tedious conversion task to American standards, they initially failed to meet Air Force specifications. By 1954, many B-57s sat on Martin's ramp awaiting engines with which to fly. Production of the engine finally reverted back to Wright Aeronautical Corporation as the J65-W-1 (later became W-5).

Before the first contract for 177 Canberras was completed, other production contracts followed. These changed repeatedly in quantities, price, and additional equipment. The first contract for FY1953 stabilised at 138 B-57Bs and an equal number of special weapon doors, plus spare parts and ground handling equipment. By June 1955 however, this contract was again amended to include 38 B-57C dual control aircraft and 120 more B-57Bs. This latter figure was reduced in October 1955 to 100, and the remaining 20 airframes were to become the B-57D. A third production contract covered the RB-57D series with FY1953 funds. The fourth and last, new production contract covered 68 B-57Es with

FY1955 funds and brought the final figure of Martin built Canberras to 403 in six production line varieties. All were completed by February 1957 – over a time span of just three and a half years between the first and the last roll-out. In the interim, Gen Boyd's warning about accelerated production before 'debugging' became a reality. There were the predicted periodic groundings after fatal accidents, one grounding lasting nearly four months while awaiting corrective fixes.

Throughout the life of the B-57, there was a reluctance by those associated with it to call it the Canberra – its true and rightful name. Perhaps the reason stems in differentiating between the British and American product, and Martin's frequent reference to the B-57 in their manuals and news releases as the 'night intruder', has led some to believe this was its actual name. Paragraph 17 of the Letter of Agreement between English Electric and Martin, clarifies this point: 'Martin shall name all aircraft manufactured by it under this Agreement "Canberra" in accordance with the usual practice of Martin with respect to other aircraft of its manufacture and shall use its best efforts to procure the agreement of the Government of the United States of America that the same name shall be used by the Government of the United States of America.'



Top left: Externally, the Martin built RB-57A showed no structural design changes to that of the British Canberra. Common to both are the dive brakes, later called speed brakes, that are square channels and emerge vertically from the upper and lower surfaces of the wing. Those on the right wing can be seen extended through the US./Martin

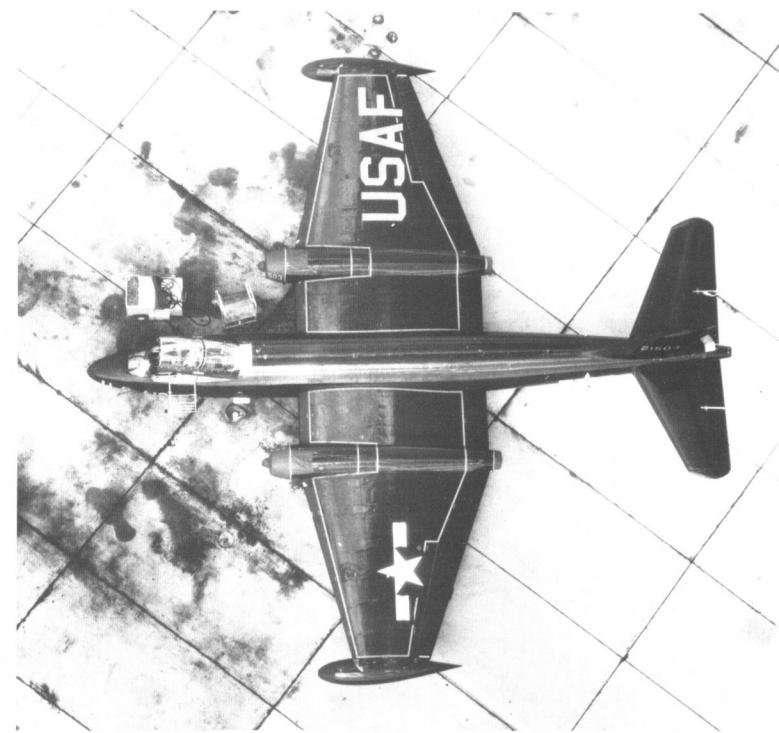


Centre left: A line-up of RB-57As on the ramp at the Martin factory in 1954 receives final adjustment before being turned over to the Air Force. Most of these pictured went to the 363rd TRG at Shaw AFB, SC. In 1970, the author flew ship No 18 in foreground, (52-1435) on its last flight to the salvage depot at Davis-Monthan AFB, Arizona. Ending with 15 years of flying, the Canberra could not have performed better! Martin

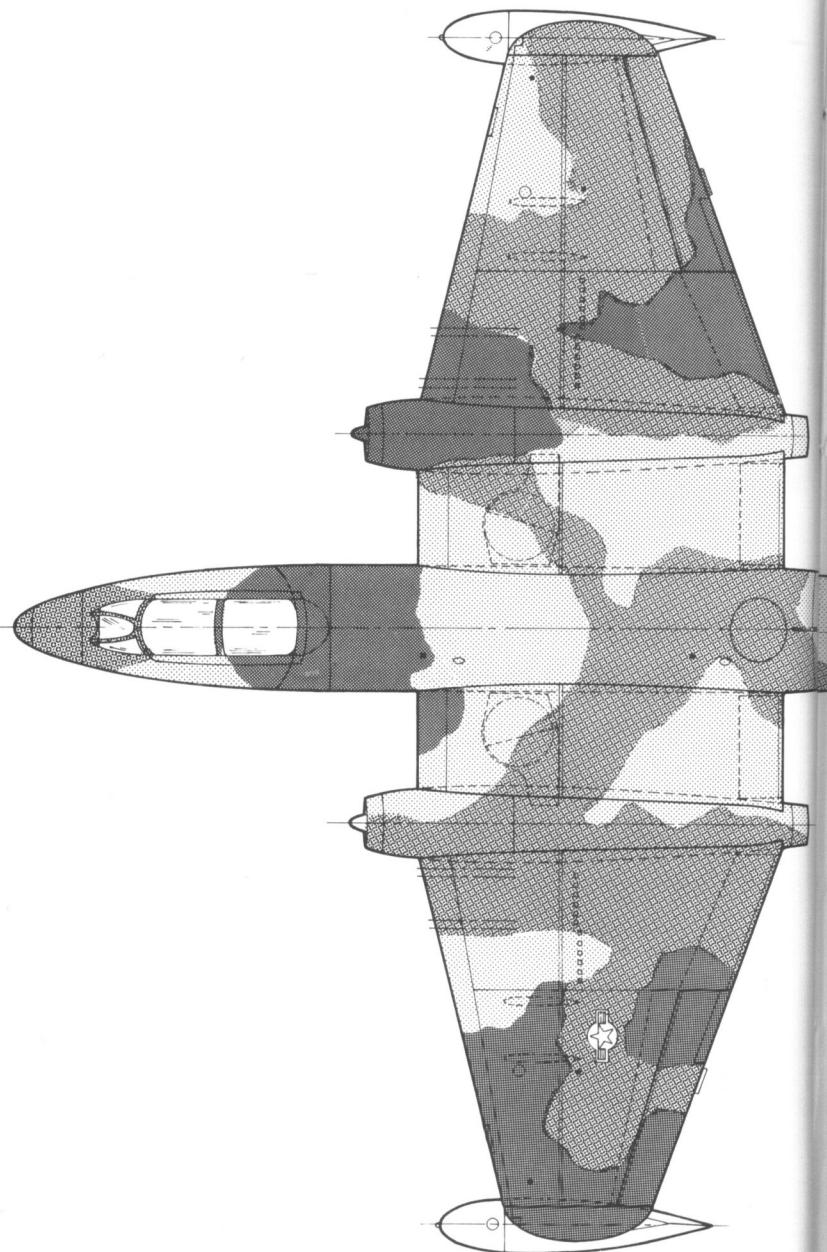
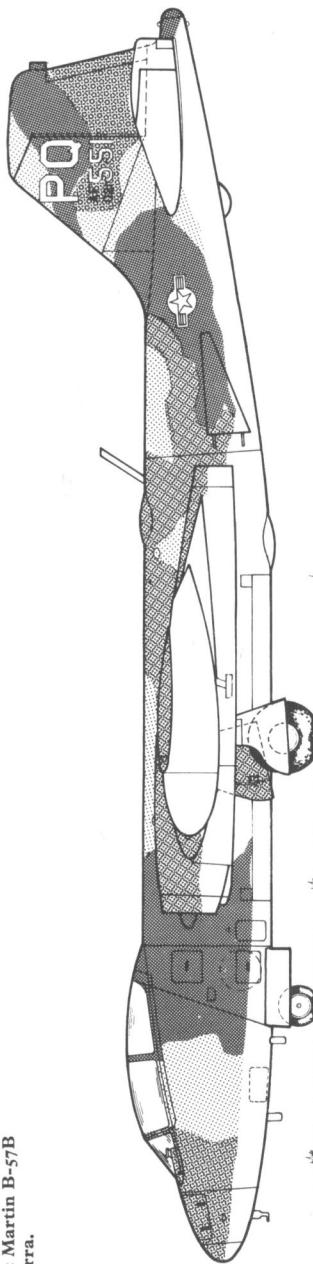
A check with the Air Force as to the official USAF name they carry for the B-57 reveals the record to show 'Canberra' for all models.

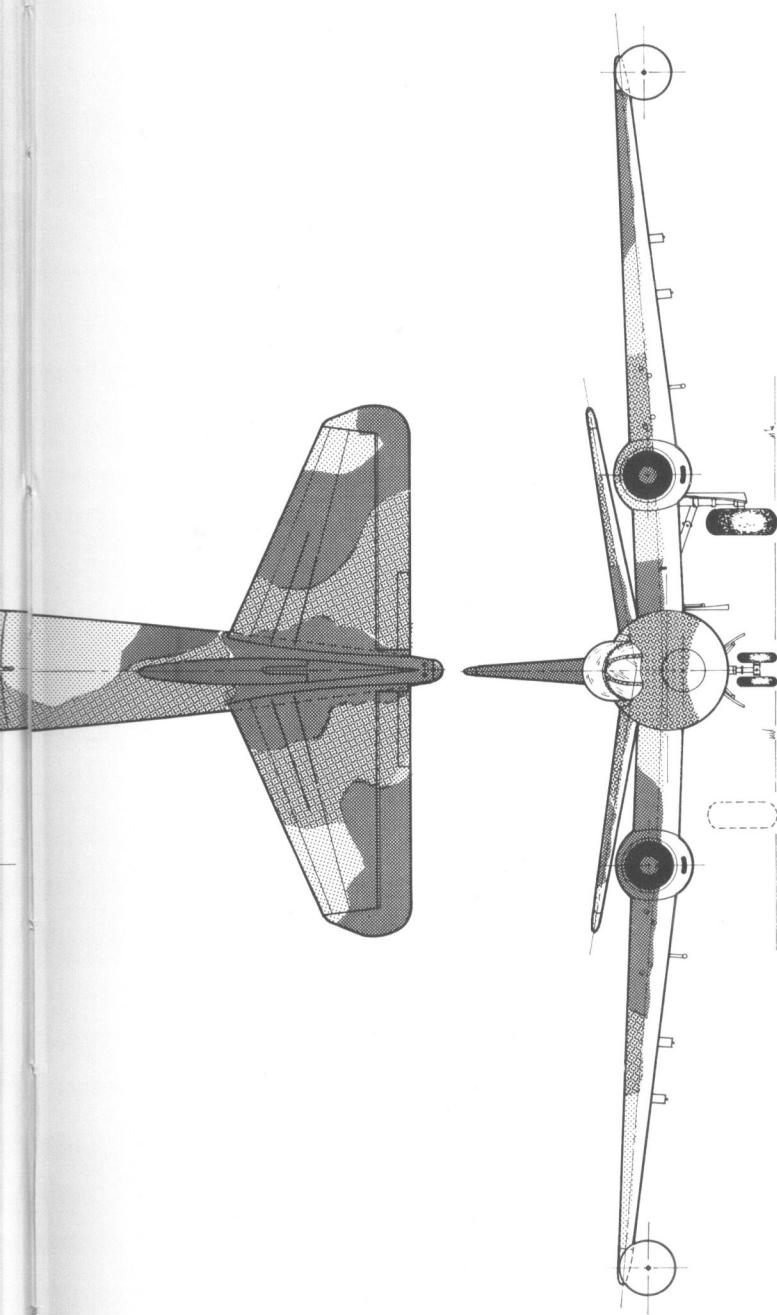
The tactical life for the B-57 Canberra as a combat bomber has nearly passed. In retrospect, the question may still remain; did the Americanisation of the Canberra go into production with the least number of changes - as directed - so as not to change the inherent design of the airplane? Or, did the other faction win out to the point that the Martin built Canberra became a pure American airplane, far removed from the British design except for general basic lines? I like to believe that it was a near perfect compromise of the best features of the two. Unfortunately, the promised sensing equipment for the night intruder role did not become available until the final phase of the Vietnam War when it was finally introduced into the B-57G series. Consequently, for the night intruder mission during the first 16 years of its operational life with outdated equipment, the B-57 was little more than a faster B-26. It proved, however, to be an effective replacement airplane for the Invader as attested by the fact that at this writing, B-57s still serve in small numbers with the Pakistan Air Force, US Air National Guard and the United States Air Force.

Below: For nearly two decades, the Martin B-57 Canberra was the only jet tactical bomber in the USAF. There was no mistaking the Canberra for any other airplane. Its wide chord wing compared to its mere 64ft span was its most distinguishing feature. With the Martin modified nose departing from the British design, its tandem seating under one canopy made it distinctively American in design. Only the wing imbedded engines were a feature not practised in US jet design./USAF



Below: Martin B-57B
Canberra.





Federal Standard 595a Camouflage Colours

Tan	Green	Dk. Green	Flat Black
30219	34079	34102	

The B-57 Enters Service

When production aircraft were able to be delivered, all four of the scheduled tactical bomber groups were being outfitted with B-57Bs simultaneously during 1955 and 1956. The first tactical unit to receive the Canberra was the 363rd Tactical Reconnaissance Wing at Shaw AFB, South Carolina, receiving RB-57As as early as 1954. A few of these were delivered to the 345th Bomb Group (Tactical) at Langley AFB, Virginia, where these reconnaissance models were temporarily used for familiarisation purposes. The 345th later became the first of the four tactical bomb groups to receive the B-57B bomber versions. It was the 461st Bomb Group (Tactical) that was the first to be fully equipped with the new bombers. After receiving their first B-57Bs in January 1955, at Hill AFB, Ogden, Utah, this unit moved to its new home at Blytheville AFB, Arkansas, over a period from July 1955 to April 1956. As part of the restructuring of the Air Force to 95 wings, the 38th Bomb Group (Tactical) was again activated on 1 January 1953 at Laon, France, with B-26s until these could be replaced with B-57Bs to support the European theatre.

In the Far East, the 3rd Bomb Group (Tactical), which served continually in that theatre from the beginning of World War II, turned in their B-26s for B-57s, and completed the four group build-up of Canberra night intruder bombers by 1957.

To provide qualified pilots for these units to be re-equipped with B-57s, a transition school was formed at Randolph AFB, Texas, as part of the 3510th Combat Crew Training Wing. Many of the first B-57Bs and B-57C dual control models were initially assigned there beginning in November 1954. The 3rd Bomb Group in Japan and the 38th Bomb Group in France, each sent three groups of six pilots each for this training. Upon completion, they were to ferry new B-57s across the water to their home units. Pilots from the 461st Bomb Group at Hill AFB received this training also, while the 345th Bomb Group handled their own training at Langley. The training at Randolph, however, did not go as initially planned. Each class was to last for two months, but because of the frequent groundings of the B-57, these classes lasted anywhere from 6 to 13 months. This coupled with delayed production caused many graduates to be returned to their home stations, only to be sent back later when their aircraft were ready for pick-up.

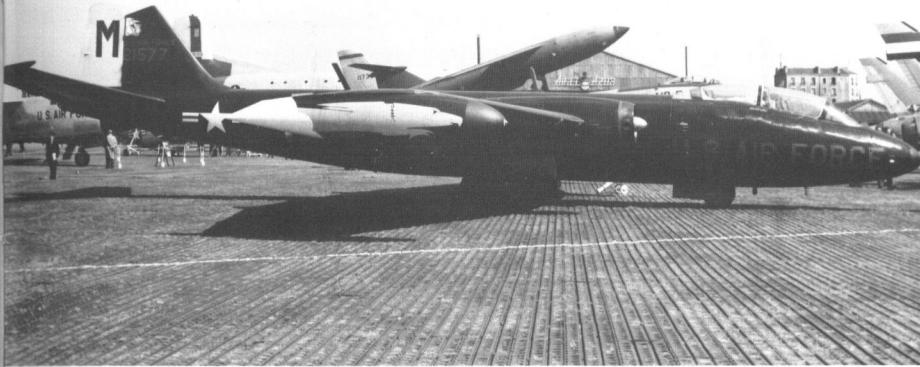
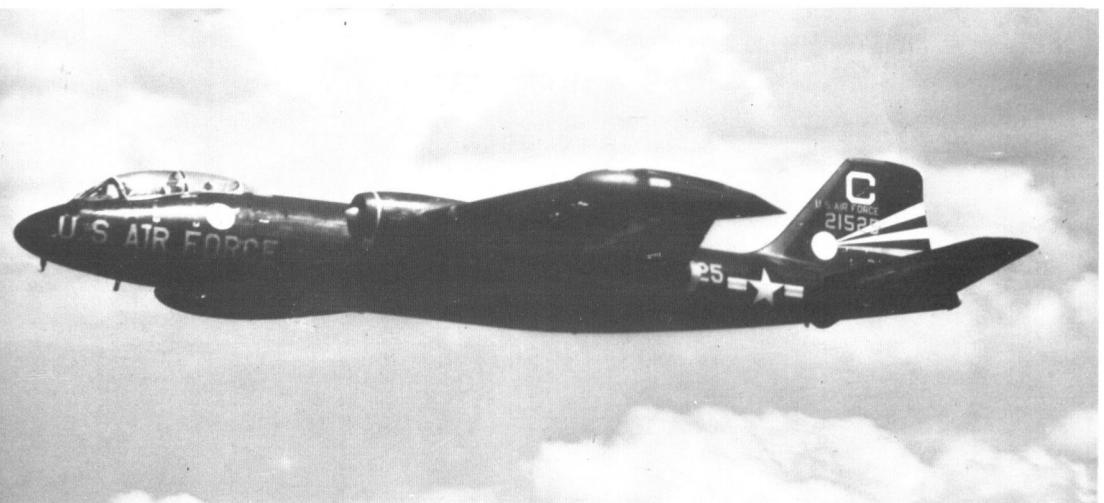
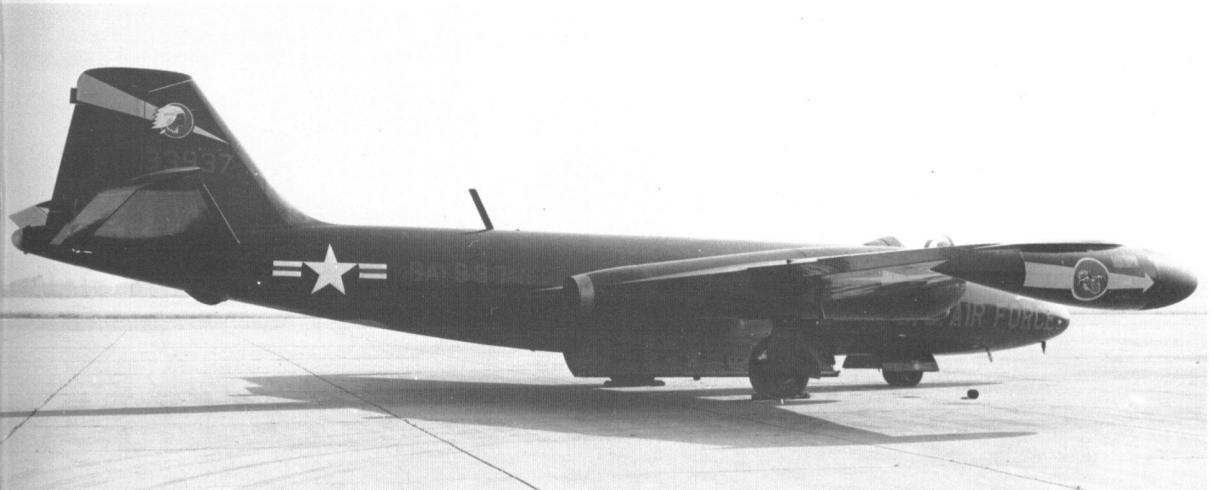
Warner-Robins AFB, Georgia, was the pick-up point for the new airplanes awaiting overseas delivery. Aircraft were usually ferried in groups of four to six, with a lead pilot of the 4440th Ferry Squadron. After a local acceptance flight, those going to the 3rd Bomb Group in Japan were flown non-stop to McClellan AFB, Sacramento, California,

Below: The first B-57 unit to receive Canberras was the 363rd Tactical Reconnaissance Group at Shaw AFB, Sumter, SC. Their RB-57As were readily recognisable by their red and white checkerboard tails. This was the only reconnaissance Canberra unit of the Air Force stationed in the United States. /Martin

Top right: This B-57B carries the insignia of the 345th Bomb Group that was stationed at Langley AFB, Virginia. The yellow tail and tip tank stripe denotes the 499th Bomb Squadron. Their unit insignia of a black bat is on the tip tank. Bomb door is rotated half open. /USAF

Centre right: The 461st Bomb Group was the first to be fully equipped with the B-57 bomber version. They demonstrated mobility by two extensive unit movements throughout Central America and over to Europe. This in-flight view shows a B-57B of the 765th Bomb Squadron. /USAF





Left: In June 1957 at Paris, this Armed Forces Day view shows a B-57B of the 822nd Bomb Squadron, 38th Bomb Group stationed at Laon, France. Their squadron colour was a yellow falcon and rudder, with a white cloud on the aft portion of the tip tank. This eventually became standard markings for all 38th BG Canberras.
/R. Walker



Top: The 38th Bomb Group at Laon, France, became well known across Europe for their 'Black Knights' aerobatic team, normally consisting of a flight of four B-57s and a solo ship. Although this was the first bomber aerobatic team, it was soon disbanded, reserving these glamorous air demonstrations for jet fighter glory. Aircraft at left has the markings of the 461st BG. *Pearcy via Anderton*

Above: On 9 January 1956, the first B-57s arrived at Johnson AB, Japan, for the 3rd Bomb Group. The Pacific crossing was critical between McClellan AFB, California, and Hawaii, as flights were over five hours with ferry tanks, and close to maximum endurance. Crossings were done in groups of four to five airplanes. Johnson AB near Tokyo is now Iruma, the HQ for JASDF.

so that a fuel consumption curve could be plotted before launching out over the Pacific. The crossing was critical due to limited fuel reserve on the longest leg from McClellan to Hickam AFB, Hawaii. Winds had to be just right, with no more than 40kts head wind component for the more than 5hr 30mins flight to Hawaii. An additional 558gal were carried in a ferry tank mounted on the bomb bay door, but more than one B-57 flamed out while taxiing off the runway at Hawaii.

The one aircraft that was lost occurred during the initial movement of 56 Canberras to Japan, and that was 916 on 12 May 1957. At Ocean Station November, a Coast Guard weather ship mid-point between California and Hawaii, it was learned that Pete Cotellesse's airplane in Black Crow Delta flight of three had a fuel system malfunction which left insufficient fuel to reach land in either direction. The only recourse was for Pete and navigator Gayle P. Johnson to eject near the ship. On the first pass, Gayle was to go out, and on the second pass, Pete would go. Signals got crossed somehow however. When Pete told Gayle to jettison the canopy (intending only to clear the cockpit of debris) he took this as the signal to 'go' which is normal procedure. He 'went out' - eight miles short of the ship! Gayle was in the water for nearly 40 minutes before rescuers located and got him on board, but the incident ended safely for both.



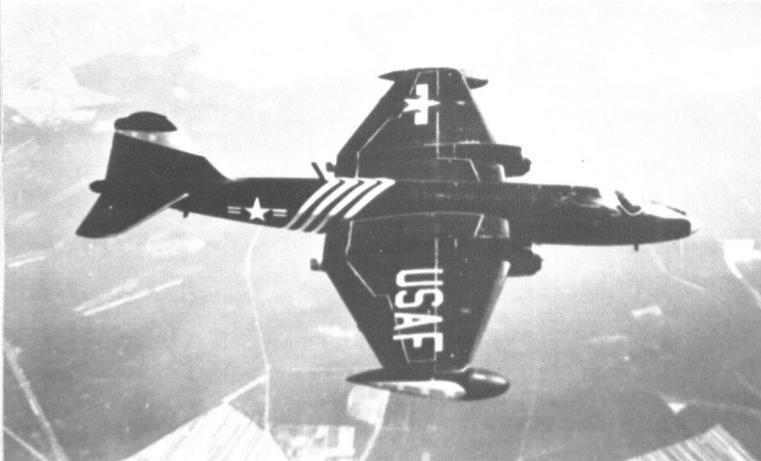
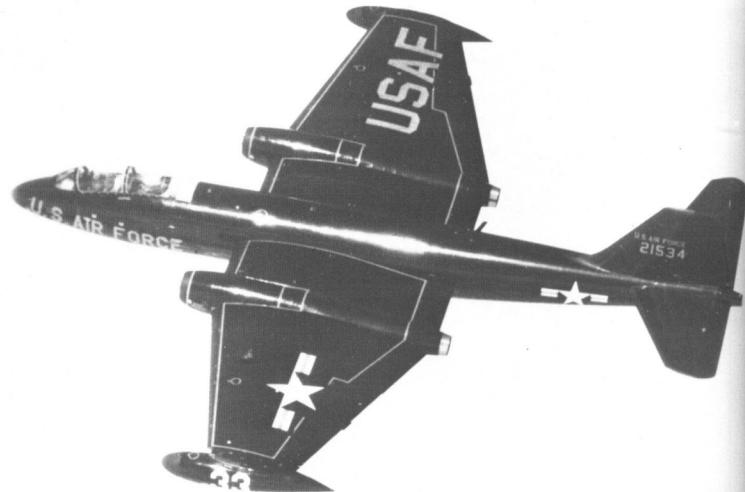


Below: A new type of warrior arrives in Japan. Dressed in the traditional 'protective clothing' of the Samurai, a Japanese host holds the flight helmet of bomber pilot Ellis Bruch as he greets the crew of the newly arrived Canberra for the 3rd Bomb Group in 1957. Navigator Floyd Pond looks on from rear seat.
/D. Beggerly

Right: The 3510th Combat Crew Training Wing at Randolph AFB, Texas, provided aircrew training for overseas units beginning in late 1954. Their aircraft were distinctive only by large ship numbers painted on their tip tanks. The 461st at Hill AFB, Utah, also utilised this training while the 345th trained their own crews at Langley AFB. /USAF

Below: Two reconnaissance units in Europe were equipped with RB-57As; the 10th TRW and the 66th TRW. This Canberra of the 66th has 4-star studded tail and tip tank flash, and yellow fuselage bands. /D. Anderton

Bottom: Air Force Canberras participated in many joint international exercises. A Sabre of the RCAF (or RAAF) flies wing on this RB-57A specially marked with yellow fuselage bands and tail flash for the exercise. /N. Taylor



The air route across the Pacific after Hawaii was Johnston Atoll, Kwajalein, Guam, then direct to Johnson Air Base, Japan (now Iruma AB, near Tokyo). Each stop along the way was filled with its own and unusual experiences. One hairy incident stands out. Five B-57s were landing at Johnston Atoll, which by its size looked like an aircraft carrier in the Pacific. As number two aircraft was making his 'short field' approach to land, gusty winds at the shore line caused his left wing tank to drag on the coral overrun. This swung the airplane to the left nearly 45deg off the runway heading, directly toward the narrow passage between the fuel storage tanks and the control tower. As all others watched in dismay, the pilot, Bobby Presley, applied full power to the engines that were resting at idle for the landing. The left engine came up to speed first and violently swung the airplane back to the right. Just then the right engine surged to full power and stopped the turn and levelled the airplane on a near original heading. With the gyrations subsiding, Presley raised the gear and gingerly held 160kts as the airplane gradually climbed in a nose low attitude since the flaps were still in the down position. 'Get your flaps up Bobby! Get your flaps up!', yelled I. H. Young over the radio as Bobby passed the end of the runway. His reply, which expressed the tenseness of the situation and afterwards became a classic slogan within the group, was: 'everything is going so good now, I hate to change a thing!'

A rash of seemingly unexplained accidents plagued the early days of the B-57s which caused long and frequent periods of groundings. Crashes were far too frequent and early

problems with the Canberra took the lives of many crewmembers. The most common and always fatal accident occurred when flying at high speed at a low level and the airplane would suddenly pitch-down into the ground. Runaway trim seemed the cause, but the reason could never be positively determined. As accidents persisted, with what seemed like increasing frequency, all tactically assigned B-57s were grounded again in May 1956, this time for a period of four months, one of the longest groundings of any Air Force airplane up to that time. One or more of nearly a dozen 'fixes' obviously corrected the pitch-down problem and no further accidents of this nature occurred.

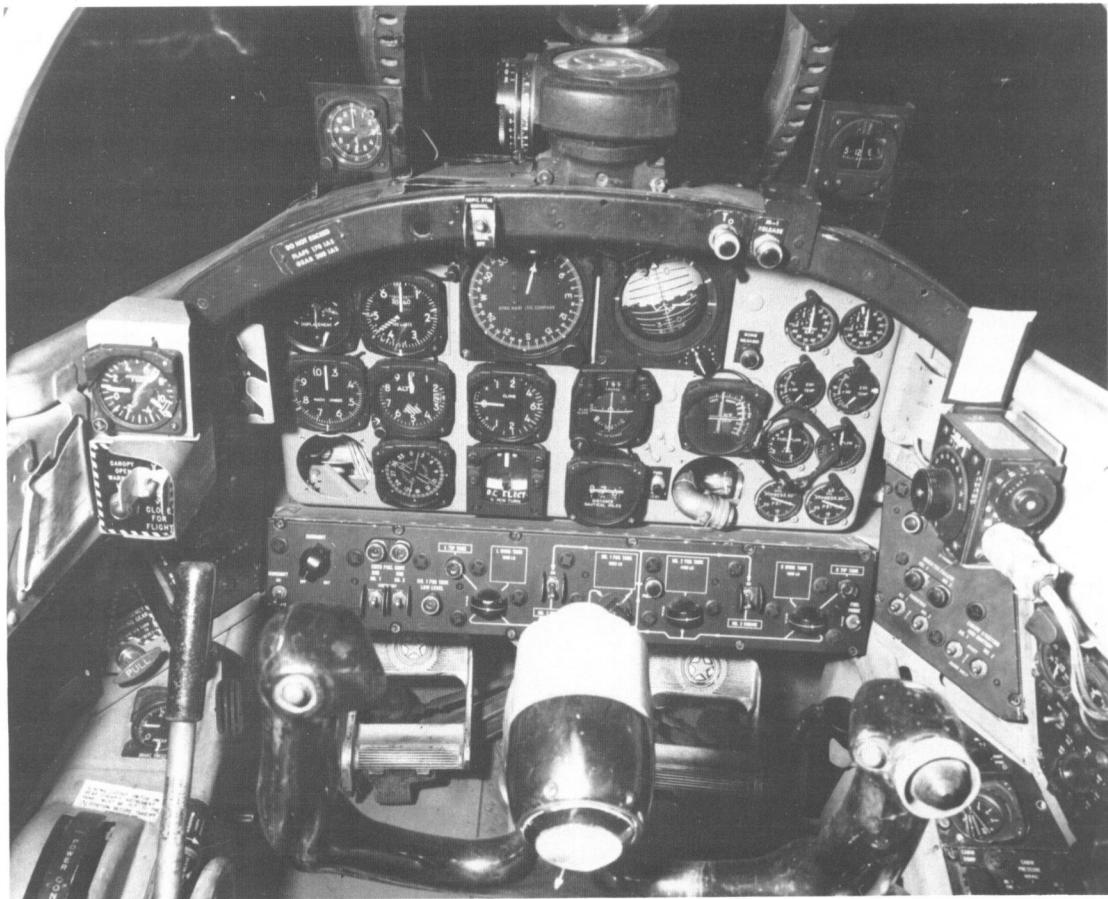
The 'fix' most reassuring to B-57 pilots was that should a runaway nose down trim condition occur at maximum speed, 80lb of pull force - which was well within the bounds of any pilot striving for survival - could hold the nose up until speed was reduced to ease control pressure. Should the trim go to full nose up, this became uncontrollable above

350kts, but the resultant climb and a power reduction would automatically reduce the speed to where it became controllable. The stabiliser trim gauge was moved to a conspicuous location where it could be monitored easily, and a switch was nearby to cut power to the trim motor.

As with any new airplane, there were many changes to be expected, and some may have already been forgotten - like cigarette ash trays installed in the cockpits when delivered! One of the earliest modifications was the re-positioning of the dive brake switch which was hidden under the canopy rail and had to be held throughout the full travel of the 'boards'. This was soon changed to a two position switch easily actuated by the thumb on the right throttle. The canopy open-close switch at the left of the windscreen went through a number of changes from a push-pull to an up-down shielded switch. Few canopies came open and off in flight since this change.

The fuel control panel was simple but initially its simplicity created trouble. It

Below: Instrument panel of the B-57 is conveniently arranged. Flight instruments are grouped at centre and left, and engine gauges are at right. Fuel control panel is laid out in schematic format, with engine fuel shut-off wafer switches already converted to toggle switches but not shown safety-wired to 'on' position in this picture. Stabiliser trim indicator above canopy switch at left.
/D. Beggerly

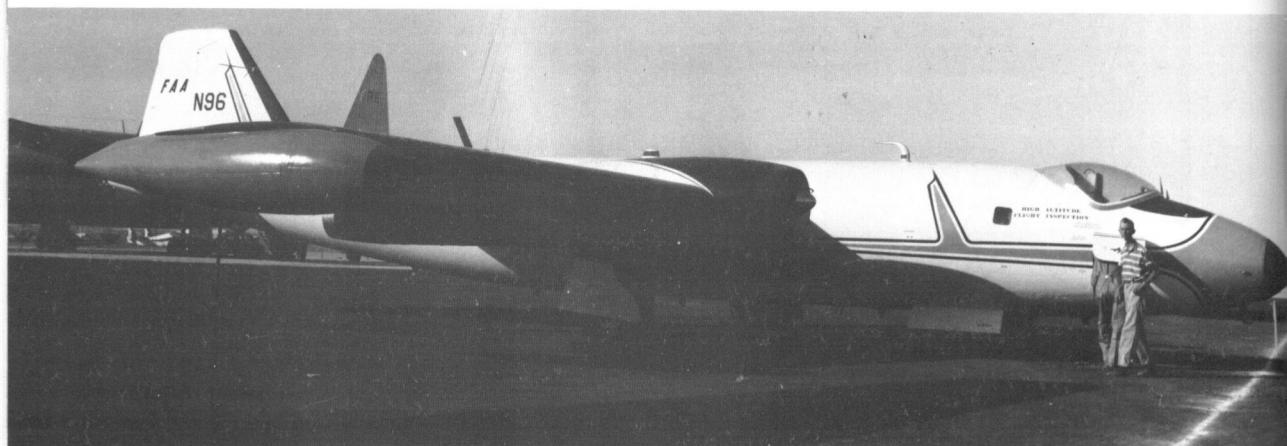


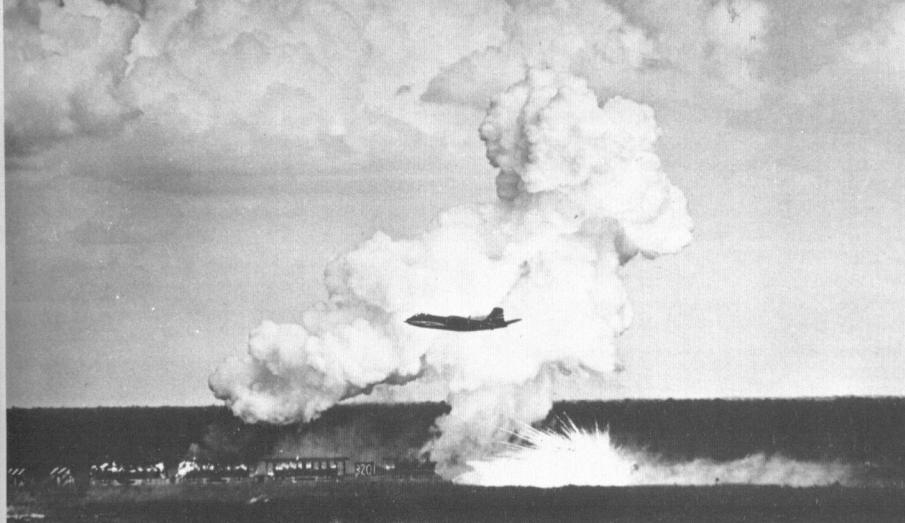
resembled a schematic of the fuel system and positioning the control knobs set up the desired flow. However, all the knobs were of the same shape and size – including the engine fuel shut off and bypass switch. When different paint colours also failed to eliminate turning the wrong knobs, these two functions were changed to safety wired switches and a square pull-knob respectively.

We felt that the Canberra noticeably lacked adequate navigation aids in that they were initially equipped with only a radio compass. TACANs were finally added by 1959 and other improvements such as solid state UHF radios, IFF with altitude readout, VOR-ILS, etc, have followed over the years. What we called the ‘poor man’s rudder boost’ became installed in the ‘Bs’ and ‘Cs’ in 1960. These were not as effective as the full-time power rudder system manufactured into the ‘Es’, but when the pilot applied heavy rudder force as needed in asymmetrical power situations (single engine), hydraulic power assist supplemented pilot effort. This did not reduce safe single engine airspeed below 155kts however.

As late in the life of the B-57 as 1972, the original ballistic ejection seats with arm rests and actuating grip handles were exchanged for the Douglas ESCAPAC zero-zero rocket seat actuated by pulling a ring positioned between the legs or pulling a curtain down over the face. (These were included in the B-57G modifications in 1969.)

The most unusual handling feature of the British Canberra and early B-57s was that when lowering the landing flaps, the nose would come up, requiring push force on the control wheel instead of neutral or a slight back pressure to hold the nose up. This was soon corrected mechanically by what was called a ‘bungee’ – an electrically operated system that would apply 25lb of push force to the elevator control system when the flaps





Left: As the new jet tactical bombers joined the USAF, they were frequently called upon for fire power demonstrations at Eglin AFB, Florida. Shown here is a 461st BG Canberra attacking a simulated train with a well placed skip bomb.

[D. Anderton]

Below: Three B-57Bs of the 3rd BW in Japan slide past snow covered Mt Fuji. When the 3rd assumed the nuclear strike mission in the Far East, their 70-83lb of black paint that had not held up well in the first place, gave way to unpainted, more heat reflective natural metal skin.

Above left: Original B-57B cockpit configuration shows dive brake toggle switch under canopy ledge (arrowed), and stabiliser trim gauge on lower right side panel. Emergency hydraulic hand pump handle is normally stowed. This thruster type ejection seat was replaced in early 1970s. *[USAF]*

Left: Most noticeable change over the years for the B-57 cockpit was the introduction of the Douglas ESAPAC rocket ejection seat. It can take the seat high enough for ground level escape and chute deployment, provided there is sufficient forward speed. A heavy blade knife designed for the nearly impossible task of cutting through the canopy is on a holder below the windscreens.

Below left: The FAA acquired two RB-57As for use in flight testing the high altitude jet route structure. N96 was formerly 52-1438, while N97 was 52-1447. FAA Canberra N96 crashed in 1960 when the pilot had to eject when the control column inadvertently disengaged as part of the emergency ejection system.



started to the down position. This artificial system in this modification made flap extension feel like that of most other airplanes.

The control column automatically stowed as a part of the ejection sequence. This cleared the way for the pilot's knees as the seat carried him out of the airplane. I only know of one instance where the column inadvertently stowed, and it took some doing to talk the FAA pilot into leaving the airplane instead of trying to land it with the use of elevator trim alone.

There were all kinds of problems in the early days of the B-57 that caused in-flight emergencies: nose wheels came off, fuel tanks would not feed, causing extreme unbalance conditions, and many more. In time however, these problems were corrected, and with experience we were better able to cope with

unusual situations. The airplane soon lived up to its full expectations.

By the time the four bomb groups received their full inventory of new B-57s, a number of tactical developments and exercises were geared to these new jet bomber units. The first of these was Exercise Sagebrush in November 1955, which took place across the lower eastern portion of the US and involved both US Army and Air Force Units. The 461st BG and 363rd TRW were the aggressors and demonstrated the swift striking capability of jet strike force by achieving a quick victory. In 1956, 13 B-57s of the 461st made up Task Force 'Vista Able' for a goodwill flight to several Latin American countries extending as far south as Lima, Peru. Again this same wing took part in 'Mobile Charlie', a deployment to support Exercise Counterpunch in Europe,

Below: Mito Range was the frequent practice target for B-57s of the 3rd BW in Japan. This rare view shows 879 having just released a 28lb practice bomb in a glide bomb delivery from its spacious bomb bay. Rocket and gun passes, as well as skip bomb, LABS and Shoran drops were also practised regularly.

(R. Barnett)

aided by B-57 Canberras of the 38th Bomb Group at Laon AB, France.

After three short years with these B-57s in tactical bomb groups, the units were programmed to be phased out. The 38th was the first to begin by ferrying their aircraft back to the US in early 1958. Soon afterwards, as of 1 April 1958, the 461st at Blytheville was also deactivated. No sooner had the B-57 bomber force been removed from Europe, however, than a threat to peace developed in Lebanon. To provide a show of force, B-57s from the 345th Bomb Group at Langley were deployed within a three hour notice in July 1958, for Turkey, as part of Composite

Air Strike Force 'Bravo'. Once in place at Incirlik Air Base, Turkey, nothing happened, but they remained there over three months, and ready for any action.

On the other side of the world, another crisis erupted in the Taiwan Straits. Again the 345th was called upon for support, and 12 or more B-57s were deployed to Okinawa on 29 August 1958. Although B-57s of the 3rd Bomb Wing were close at hand in Japan, world tension kept them tied to their assigned strategic targets in that part of the world. For this time period, the strength of two squadrons of Canberras from the same 345th Bomb Group in the US were sent off in opposite



Above: This very rare picture was taken of 3rd Bomb Wing aircraft on alert within the secure area of Pad C at Kunsan, Korea. Since atomic weapons could not be positioned in Japan, immediate strike force B-57s had to be kept in Korea. One 17ft long Mk7 special weapon is loaded on each of these 'Quick Strike' Canberras

Right: A full generation of pilots flew USAF B-57s. Barbara Lynn Bruch, age 10, welcomes her daddy back to Japan from Korean deployment in 1958. Eighteen years later she married B-57 pilot, 1-Lt Timothy Killeen, a member of her father's unit, the 4677th DSES while at Hill AFB, Utah. *USAF*





Left: On 2 April 1964, the 3rd Bomb Wing no longer had a nuclear strike commitment and returned all its forces to its home at Yokota AB, Japan. The return of 20 airplanes filled the ramp to overflowing with a full wing complement of B-57s. Wives and friends met the B-57 crews at their planes for this highly celebrated event.

Below: The 'Pickle Barrel' trophy was the focal point of esprit de corps for the 3rd Bomb Wing, being awarded to the squadron having the highest overall B-57 weapon delivery rating during a quarterly period. As the 3rd BW deactivated in 1964, Lt-Col Fred Grindle, CO of the 8th Bomb Squadron, accepts again the coveted award for his squadron. To his left are Carl Bratten, and toasting is 'Bear' Barnett, both killed in the 8th BS after it deployed to SEA. At right is Operations Officer Howard O'Neil, destined to drop the first live ordnance on an enemy from a USAF jet bomber while CO of the 13th TBS. To his right is author Bob Mikesh, then a winning team member of the 8th. The 'Pickle Barrel' stayed with B-57 units throughout the war in SEA and was retired to the Air Force Museum at Ubon when the 13th TBS was deactivated in 1972.

directions on tactical operations and nearly met on the other side of the world. When the dust settled, the 345th was disbanded on 25 June 1959, leaving only the 3rd Bomb Wing to survive for nearly another five years as the only tactical bomber wing within the USAF. Its existence seemed essential, however, as its primary mission was a SIOP (Single Integrated Operations Plan) commitment for 'Quick Strikes' against strategic targets on the mainland of China, North Korea and Russia. Since nuclear weapons could not be maintained in Japan, the 3rd Bomb Wing set up a rotation of aircrews to stand alert at Kunsan, (K-8) Korea, with nuclear armed B-57s which were ready to be launched against preplanned targets, and to be airborne within 15min notice. At first, alerts lasted for a month at a time as each of the three squadrons took a turn, but soon changed to a two week crew by crew rotation. This continued for an agonising period from August 1958 to 2 April 1964. Approximately one-third of the wing was at Kunsan all the time, which meant for the air and ground crews, one-third of their time was spent away from their families living in Japan. I know, for I had my share of deployments to 'Pad C' at K-8 for the last year of this period.



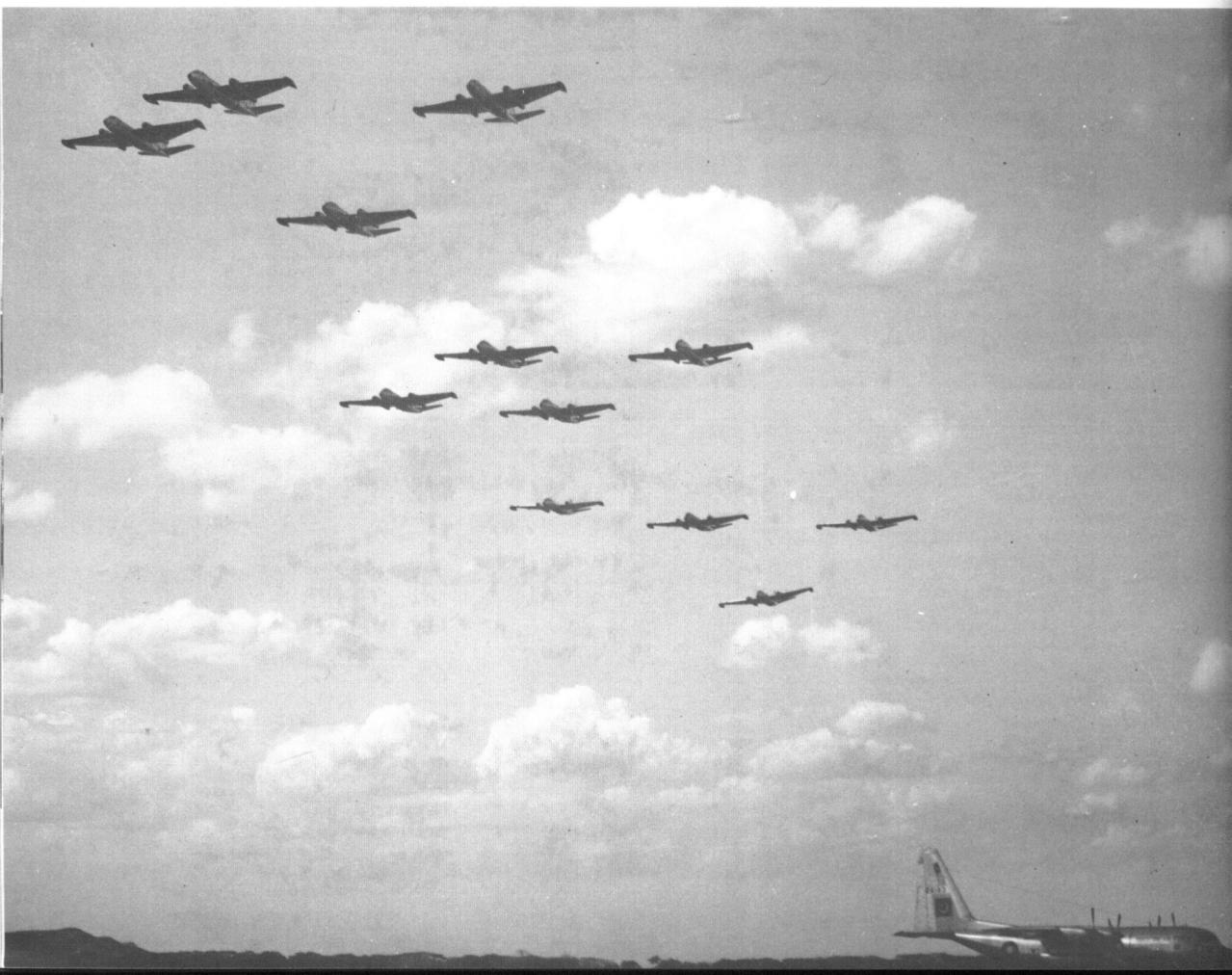
Clark AB and the Bien Hoa Deployment

This new chapter for the B-57s began with a plan that would inactivate the 3rd Bomb Wing and bring to an end the last remaining Tactical Bombardment Wing in the United States Air Force. As the wing and its squadrons were to phase down, crews being rotated to the United States would ferry their Canberras to the Massachusetts, and New York Air National Guard. Before 2 April 1964, which was the last day of the 'Quick Strike' alert commitment at Kunsan, Korea, five B-57s (918, 935, 897, 900 and 854) in two flights had already departed Yokota Air Base. The escalating war situation in South-East Asia changed the inactivation plan in mid stream and sent the 8th and 13th Bomb Squadrons to Clark Air Base

in the Philippines, and returned the 3rd Bomb Wing and 90th Bomb Squadron on paper to the United States. On 9 April 1964, 12 of the first Canberras arrived at Clark, led by Lt-Col Billy A. McLeod, Squadron Commander of the 13th. The 8th began arriving on 17 April led by Squadron CO, Lt-Col Frederick W. Grindle, Jr, and by the 29th, all 47 of the former 3rd Bomb Wing's B-57s were in place at Clark.

A war of nerves for the B-57 crews continued to build as the imminent war situation in Vietnam escalated. Although US forces were present in South-East Asia at the invitation of the South Vietnamese government as military advisors, direct military force could

Below: As a salute to their new home, 12 B-57s of the 13th Bomb Squadron arrive from Yokota AB, making a formation fly-by upon arrival at Clark AB, Philippines, 9 April 1964. This sudden reassignment was initially a temporary one, dependent upon the war situation in the theatre.
/L. P. Graham



not be applied unless provoked by North Vietnamese aggression. The provocation needed, however, occurred on the night of 2 August 1964, with what is historically referred to as the 'Tonkin Gulf Incident.' North Vietnamese torpedo boats made deliberate attacks upon the US destroyer *Maddon* while it was on patrol off the North Vietnamese coast. This, and a subsequent attack two nights later, touched off an exchange that brought the United States into direct military involvement with Viet Cong and North Vietnamese forces.

At Clark, everything was in a wartime atmosphere. Fighter units were deploying, air transports were lifting supplies, yet the two B-57 squadrons were held on ready standby. Should they move, their destinations would be either Takhli Air Base, Thailand, or Bien Hoa (pronounced Ben Wa) - an airfield about 10 miles north of Saigon. Anxiety by the B-57 crews grew tense, knowing it was going to happen - but when?

An alert notice to deploy the two B-57 squadrons came just before midnight on 4 August, yet by early morning disappointed crews were told to return to their quarters to again stand-by for further information. They were anything but relaxed. By that evening, the movement order came by message ordering deployment of 20 B-57s to Bien Hoa Air Base as soon as possible. Crews had already been assigned to aircraft, and now flight plans to this just announced destination were hastily prepared for the five flights of four aircraft each. Lt-Col Billy McLeod led the first flight off at 19.00hrs and each succeeding flight launched at 20-30min intervals. What had not been taken into consideration as the hours of the day dragged by without a word, was that the deployment might be made at night. Few of the crews were current in night formation as it had not been a B-57 combat crew training requirement. Regardless, the departure in flights of four worked out quite well for their first time in darkness. It was at the other end where problems soon developed. Bien Hoa was an unfamiliar field for most of the crews, especially with added restrictions caused by darkness and the 700ft ceiling of monsoon weather. Uncertainties after landing caused one aircraft to delay on the runway, allowing another with loss of hydraulic brake pressure to overtake it in the darkness and collide with it. As a result, 884 was a write-off, however, after much work, 877 was repaired. Adding even more to the problem, another B-57 blew both tyres on landing roll which further tied up the runway. Fortunately, there were no injuries from these mishaps.

The remaining B-57s destined for Bien Hoa had to be diverted to Tan Son Nhut, a few miles away. Deviations from intended flight

plans while enroute can become the basis for a bad situation, at night, and with so many aircraft involved. For reasons which were never satisfactorily determined, Capt Fred Cutrer, and his navigator, Lt Kaster crashed in 870 a few miles short of the runway at Tan Son Nhut while on a straight-in TACAN approach. This crash site was in a heavily populated VC area and was considered a combat loss. It took weeks before a diversionary and a sizable main force could be staged to retrieve their bodies from the crashed plane.

These losses made anything but a good showing for the B-57s at the start of their operations in South-East Asia. Investigation of these mishaps traced the root of the cause to the movement order and the interpreted meaning of 'as soon as possible'. In a wartime situation, most commanders would construe this to mean 'now', while in a peacetime atmosphere, it would imply to move after proper crew rest, and under suitable flying conditions commensurate with training received. Needless to say, later messages of this type were given closer scrutiny before issue following this deployment.

Below: With Mt Arayat prominent across the field at Clark AB, a B-57 from the 8th BS, flown by Roy White and John Kendrick, touches down on the runway at their new home base. The strength comprised 47 Canberras outfitting the 8th and 13th Bomb Squadrons.

Bottom: Somewhat traditional when a squadron arrives at a new home station, the 'red carpet' is rolled out for the lead crew. Lt-Col Grindle, CO of the 8th BS is about to receive royal treatment on his arrival with his squadron at Clark AB./I. P. Graham





Above: Committed to the combat zone in August 1964, a detachment of B-57s from Clark stand ready on the east ramp at Bien Hoa AB near Saigon. Conditions were crowded, and protection from enemy assaults was minimal.
/USAF

Right: One last check of the 500lb low drag bombs on the B-57 wing pylons is made by Enos Chabot of the 8th BS. Initially B-57s were not involved in combat strikes for the war was restricted to propeller driven airplanes only, this being established by the Geneva Accord of 1954./USAF



A fighting force of B-57s was now in the combat zone and ready for action, however it would be seven months before the Canberras would be given an active role in combat. In the meantime, their presence in Vietnam displayed to the invaders a stronger US fighting force, which may, or may not, have had an effect on enemy strategy. Prior to this move and many months after, two or three B-57s were assigned courier duty on crew rotational basis at Tan Son Nhut.

Now that a portion of each of the two bomb squadrons were deployed to South Vietnam, their presence was given little notice in the war effort. Seemingly as a pacifying gesture, they were given road reconnaissance missions – but no engagements or attacks were allowed, and the B-57s flew unarmed. They were to cover the roads leading out of Saigon, and report any enemy ground activities or road blocks along these routes. These missions, al-

though flown with much enthusiasm initially, proved to be futile the majority of the time. Occasionally a flight would report a road block thrown up by the Viet Cong, however, these reports seemingly were not utilised in strike missions. Sortie requirements degenerated to four per day, and to keep everyone busy, one crew would fly for 30–45 minutes, then land so that a crew change could be made and continue with the same mission. By this time the Bien Hoa commitment, more formally called 405th ADVON 1, was an unpopular TDY (Temporary Duty) as far as the air crews were concerned. This attitude was due, in part, to the extremely limited activity afforded the B-57 aircraft in the Vietnam conflict. Other air units were launching out of Bien Hoa, and were under a full combat commitment while the Canberras were restricted from actual strike missions. Tensions mounted, caused by the ‘ribbing’ dealt out

Below: Maintaining a show of force posture in South Vietnam a formation of B-57s start all engines simultaneously at Bien Hoa for departure on assigned road reconnaissance routes. This became painfully dull for the crews who knew that other types of aircraft were allowed to make air strikes against the enemy.

Bottom: In the early morning of 1 November 1964, the east ramp at Bien Hoa AB was aglow with burning B-57s after a mortar attack by the Viet Cong. Five Canberras were destroyed and many others damaged./USAF



from those engaged in the war. To ease this strain on morale, squadron members were rotated regularly so that the TDY period was only one week per month for each crew. Half of the aircraft were returned to Clark on 15 October to reduce the TDY burden and the load on the overcrowded base. This proved fortunate.

It was late on Halloween night 1964, hardly three months after the arrival of the B-57s at Bien Hoa, when another disaster happened. A surprise enemy mortar attack caused a crippling blow to the base and its occupants. Everyone talked of these possibilities, but no one did anything about it. Seemingly, the reason being that the bomber squadrons and other American units were merely tenants on the base, and base security was that of the ARVN forces. But at 00.25hrs on 1 November, the expected happened. The Viet Cong launched a stand-off mortar attack against the base, using six 82mm mortars emplaced less than a quarter mile outside the northern

perimeter. Communist gunners fired between 60 and 80 rounds into the base and swiftly departed, undetected and unmolested. At the sound of the first incoming enemy fire, everyone took cover. The explosions which followed, coupled with the illumination caused by flames made it evident that the rounds had hit home. The Canberra crews were billeted in the American compound located in the centre of the main base, and from the direction of the fire seen against the sky, there was little doubt that the B-57 ramp had been hit. Of the 20 Canberras parked wing tip to wing tip in four rows, five were destroyed, of which two were burned to the ground. These were 555, 892, 894, 914 and 924. Four Americans were killed and 72 others wounded. The Viet Cong were the victors that night, inflicting damage out of all proportion to the effort expended. This became the bomber squadrons first losses due to combat, and they had not had a chance even to drop one bomb up to this point. In addition to the five Canberras lost, 15 others were

Below: Shrapnel opened the wing tanks of 555 allowing its fuel on the ramp to be ignited by the airplane burning next to it. This airplane was a total loss along with four others.
/USAF

Bottom: Two Canberras were completely burned to the ground leaving only their jet engines. Had this enemy attack taken place a week earlier, twice the number of bombers were on the ramp and losses would have been greater.
/USAF



damaged and four VNAF A-1s were destroyed or damaged.

There were few changes after the incident as ramp conditions were such that sandbagging revetments in the cramped space was impractical. To give a smaller target should there be further attacks, the number of B-57s at Bien Hoa was reduced even further.

The next problem at hand was in maintaining trained crews for the Canberra squadrons. The *old heads* that came with the airplanes from Japan were nearing the end of their three to four year overseas commitment. Many new arrivals were without prior B-57 experience and the two squadrons were launching 40 to 50 training flights a day, making Clark resemble a training base. The maintenance workload on the airplanes was drastically increased. The problem was alleviated somewhat by new pilots receiving B-57 transition training with the Kansas Air National Guard at Hutchinson, prior to leaving the States.



Above: Mortar attacks against US bases during the war were a common occurrence. In addition to B-57 losses at Bien Hoa that night, four Americans were killed and 72 others wounded. President Johnson called for immediate replacements for the Canberras to be sent from the US./USAF



Left: A fork lift truck gathers the few remaining pieces of 894 to clear the ramp at Bien Hoa. The B-57 squadron felt these losses, but they did not let them restrict their operational flying commitments against the enemy.

First Blood

Nothing remains stationary in a war situation and in the opening months of 1965, a major change in air tactics was being formulated. Morale of the South Vietnamese was at a very low ebb. There was no appreciable change in the war situation that indicated progress in their cause. American air power was present, including jet fighters, but only propeller driven aircraft were being used. The Americans were abiding by the Geneva Accord of 1954, which stipulated that no new military weaponry would be introduced in Vietnam by either side. Canberras and other jets continued to fly unarmed visual reconnaissance missions. However, in the previous year, the North Vietnamese had violated that agreement and the South Vietnamese Government asked the United States to allow jet planes to be used for combat strikes.

Word reached the Canberra crews that should the restriction be changed, B-57s would be used. On 19 February, that day came, setting a new milestone in the Vietnam war. With Viet Cong troops achieving impressive gains, US Army General Westmoreland, Commander, MACV (US Military

Assistance Command, Vietnam) – invoking authority given him three weeks before to use jet aircraft under emergency conditions, ordered the B-57s into action. For two days, B-57 crews had been on alert, and when the execution order was issued at 14.00hrs, they were ready. The first flight of four responded with exuberance and were airborne at 14.30 hrs. Twenty minutes later they were over the target, a suspected concentration of Viet Cong guerilla forces near Bien Gia, about 30 miles east of Saigon. A Forward Air Controller (FAC) in an O-1 Bird Dog had received ground fire and marked the target with smoke rockets when the B-57s arrived. Maj Howard F. O'Neal, Commander of the 13th Bomb Squadron, with Maj Frank R. Chandler, Squadron Navigator, peeled off for the attack and became the first crew to deliver live ordnance against an enemy from a US Air Force jet bomber, that Canberra being 53-3888.

Following closely on the heels of this first attack was another B-57 flight of four, led by Capt Bennett Stone of the 8th Bomb Squadron. In 905, with Ray Pence as navigator, Ben

Below: Both engines of this B-57 at Bien Hoa come to life simultaneously as the last trace of smoke belches from its starter cartridge exhausts. On the wing stations of 888 are 500lb GPs with an internal load of 21 260lb fragmentation bombs. /USAF

Right: The first American jet bomber to drop live ordnance against an enemy was this B-57B, 53-3888 of the 13th Bomb Squadron. The attack took place on 19 February 1965 against a suspected concentration of Viet Cong guerilla forces near Bien Gia, east of Saigon. /USAF

Below right: Bombs were the most effective weapons carried by B-57s but, special missions sometimes called for the addition of rockets. Four 7-tube rocket pods were carried on wing stations for 2.75in 'Mighty Mouse' rockets. 'Yellow Quebec' (tail letter) of the 8th BS salvoes on the enemy below.





made the first bomb drops for the 8th. Through these attacks, several secondary explosions were observed by the crews and the FAC, but the overall damage inflicted on the enemy was obscured by the dense jungle foliage. A total of 18 B-57s attacked that target and all of the Canberras returned to Bien Hoa unharmed. F-100 fighters joined in the attack later that same day. Ironically, a party had been organised that night for those Canberra crews at Clark. The mood skyrocketed when Maj Roy White, Commander of the 8th announced the news of the raid. Morale literally zoomed, and the next day a high spirited augmentation force of three more crews left for Bien Hoa.

Two days after this first attack an Army Special Forces team and a Civilian Irregular Defense Group (CIDG) company were caught in a communist ambush at the Mang Yang pass on Route 19, east of Pleiku. Supported by F-100 and B-57 strikes, which prevented the enemy from overrunning Allied forces, US helicopters moved in and successfully evacuated 220 men who might otherwise

have been lost. Although the military situation in Vietnam remained discouraging, the events of February 1965 marked a turning point in the history of the war. Officials in Washington no longer talked about withdrawing American military advisors, but instead, now recommended deployment of additional US forces to South-East Asia, viewing a swift conclusion to the war. The stops had been pulled for action by the B-57s and when March arrived, they were scheduled to fly their first out-of-country mission in a war that seemed to have no territorial boundaries.

To provide maximum support, more planes and crews arrived from Clark bringing the total force to 28 planes and 30 crews. Three possible targets were planned and studied, all seemingly in high risk areas having radar controlled AAA gun protection. The selection became Xom Bang, a military staging area 17 miles north of the DMZ (Demilitarised Zone). Despite one day delay due to weather, the attackers became airborne at 14.50hrs on 2 March, damped only by a drizzling rain. One aircraft aborted out of 20, and it was replaced by one of two airborne spares. The Canberra crews were leaving nothing to chance for not giving a good showing. Spaced 10 minutes apart, the bomber formations of five flights of four planes each, passed their checkpoint at Da Nang. Here they turned their radios to the target area control frequency, only to be stunned to hear that three F-105 flak-suppression aircraft had already been downed by intense AA fire in the target area. Heavy resistance was expected, and this confirmed it.

The bombers pressed on and as the former capital city of Hue (pronounced Way) came in sight, they went 'on the deck' to avoid

radar detection until the pop-up for the actual dive bomb run. All crews were to make one pass only, releasing all ordnance, but a second pass could be made only if the first was not successful. At the time of the arrival of the lead flight on target, parts of the target were already smoking from flak suppression ordnance. The Canberras led by Maj Roy White came in and dropped without difficulty. After his flight had made their attack, they stayed nearby and flew air cover for the other flights until low fuel demanded that they depart and recover at Da Nang. Capt Fred Huber, leader of the last flight also recovered at Da Nang with low fuel, while the others returned safely to Bien Hoa.

Some battle damage was incurred but none serious enough to cause any major problems. The Canberra crews felt they had at last earned their place when bomb damage assessment photos showed over 95% destruction in the target area. The heavy loads carried by the B-57s had indeed proven most deadly against the North Vietnamese. The 20 aircraft dropped over 96 tons of bombs, with a distance to the target of 450 miles.

As the missions became more challenging with enemy resistance increasing, combat losses were soon to begin. The first of these occurred on 11 March 1965. Bill Mattis and Dick Smith were in 890 on a two ship in-country strike, when the Canberra erupted in flames during an attack and crashed about three-quarters of a mile beyond the target. Ironically, Jim Lewis, who was flight leader on that mission, was the next to be lost along with his navigator Art Baker on 7 April. His Canberra 880 failed to recover from a dive-bombing pass, apparently being hit by ground fire during the attack.

Below: Markings adopted by the 3rd BW in Japan remained with these B-57s in SEA until they were camouflaged. Here, B-57C, 856 retains its green fuselage band denoting 'Training Flight' and green ship number, but now assigned to the 8th BS which normally used yellow markings. 'Red Juliet'; 886 remained assigned to the 13th BS with its proper red colour markings./USAF



Night Intruder Missions

While B-57s proved their worth as excellent close air support aircraft during the day, it soon became evident during this time period that it was the most suited aircraft for the night interdiction role. Enemy supply lines flourished under cover of darkness and in March 1965, B-57 night missions out of Bien Hoa began with a determination to slow this traffic. In anticipation of this, the two B-57 squadrons had begun night flying training at Clark at the turn of the year.

The first night missions were led by Capt Fred Huber of the 13th, over a free strike area 68 miles south of Da Nang. The technique was for the lead aircraft to locate the target area and drop parachute flares for illumination. The second aircraft then made regular ordnance passes with bombs and guns. Later, at the direction of 2nd Air Division, Maj Howie O'Neal experimented by using a C-130 as the flare ship which gave freedom for both B-57s to work the target. Night attack training of this type continued in-country through the rest of March and into mid-April. By the time the B-57 crews were trained and ready for night intruder work along the supply routes in Laos, a well coordinated system had been worked out. Although not all night missions were flown in identical fashion, one

in particular proved very effective. Two B-57s would depart Bien Hoa climbing to 30,000ft on a route that would take them to a pre-determined location, usually a TACAN fix or a prominent geographical location, generally across the Laotian border. Approaching this location, it was not difficult for the lead bomber pilot to sight the rhythmic flash of the rotating red beacon on top of the C-130 flare ship. Called 'Blind Bat', this C-130 would be circling at 15,000ft where a most unusual formation would form. The two B-57s would join on the C-130, one on each side, remaining slightly high so as to maintain position by the white lights displayed only on the top of the aircraft. The red beacon would now be turned off. Below and slightly to the side was a strange friend to this incongruous formation; a Marine EF-10B Douglas Skyknight. This two-place twin-jet straight wing fighter even predicated the Canberras, and a squadron were stationed at Da Nang. They were an excellent airplane for the purpose. Protecting this air strike team, they jammed radar controlled AA and detected hot missile sites that might be preparing to launch. One B-57 pilot recalls that a twin-engine Grumman S-2 Tracker filled the space of the EF-10B on at least one occasion. As if this were not enough, an RB-

Below: The B-57 proved to be the best airplane in SEA for night intruder missions - the purpose for which it was selected 14 years before. Good visibility from the cockpit without structural hindrances was a marked feature. It could be slowed in flight sufficiently for the crew to have time to pick out targets and line-up on an attack run. Good loiter time and large bomb loads were also important assets.





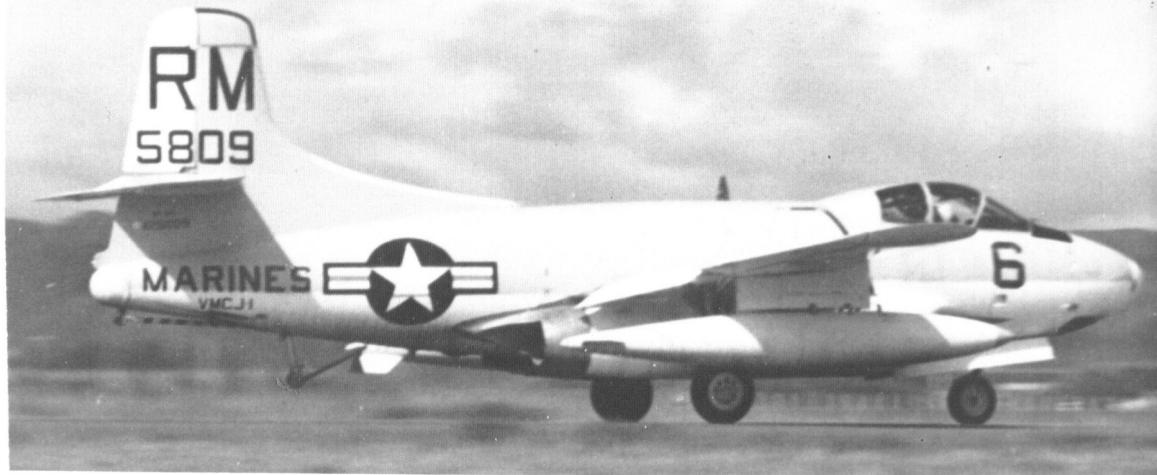


57E from the 'Patrica Lynn' unit at Tan Son Nhut joined in a trail position behind the C-130. This aircraft equipped for night photography would take real-time photographs to record the night's accomplishments. After the first few weeks of this night operation, the 'Patrica Lynn' accompaniment was discontinued.

Once joined, the formation proceeded to a point on the vital highway network, dubbed the 'Ho Chi Minh Trail' that fed the enemy to the south. The mission was to destroy any truck convoys that might be sighted as they carried supplies on their southern movement. It was difficult to locate trucks visually at night. They moved with their lights blacked out or dimmed, then would pull into the woods when aircraft were heard overhead. The darker the night, however, the easier it was to spot convoys now forced to use lights. With the formation now at 8,000ft, in the mountainous area, it was the crew of the C-130 that would spot the convoy. When located, the C-130 commander would call it out to the other aircraft in the flight and indicate he was preparing to drop flares in two or three minutes. The two B-57s would move off to the side and drop down about 1,000ft below the flare ship. The C-130 pilot would announce when the flares fell away. Twelve evenly timed sparks could be seen as the igniters deployed small parachutes that suspended the flares. Moments later a string of white flares would light up the landscape. The road would become quite visible. But it would be rare if a truck could be seen unless caught in an open unsheltered area. At least their hiding locations along the side of the road in the area they were last seen could be estimated and it was time for the B-57s to do their work in the few minutes the flares lasted. Each Canberra took its turn dive bombing and strafing the target area, calling off their positions by radio so as not to interfere with the other crew's attack.

With the ordnance loads that the aircraft carried, it was the rule rather than the exception that one or more trucks would be hit and explode or burn, even though concealed from sight. Sometimes this would cause a

Left: Many tasks in the war in SEA were performed by the Lockheed C-130 Hercules. One of these was to act as flare ship for B-57s. Known by their call sign 'Blind Bat', two B-57s would fly formation with it to the target, then when it was lighted by flares from the C-130, the Canberras would break away and begin the ground attack./USAF



chain reaction with nearby trucks, and the kill for the night could become quite high. Even if missed, the mountain roads would be heavily damaged and required extensive repair which decreased truck traffic considerably – which was the objective.

Most of these strikes would be interrupted by automatic weapons fire from emplacements strategically located along all the supply routes. The same flares lighting the ground also silhouetted the B-57s at certain points during the attack. As Canberra crews will attest, their defensive fire could be effective. The EF-10Bs were able to keep track of the big stuff and call a warning, but close to the ground, the B-57s had to battle it out alone. Many a tail feather came home riddled. Some did not come back at all!

The first of these night missions into Laos took place on 1 April 1965 in the area of Tchepone, where the supply routes filter in from North Vietnam. Capt Ben Stone of the 8th Bomb Squadron led the flight of two B-57s and joined with the C-130. As flares began illuminating the area of a suspected river crossing, Bev McCord, the navigator in the back seat spotted a ferry boat and the attack began. Art Jepson and Dick Ryan of the 13th in the second ship got near misses followed again by Ben Stone, who drove in the sinking blow. When the strike ended, the estimate of damage was one ferry boat destroyed, four trucks sunk with it, one bridge and approaches damaged and approximately 20 buildings destroyed by secondary explosions. Pressing the mission even further, they continued northbound to the Mu Gia Pass on the North Vietnam border. This first night mission into Laos marked the beginning of Operation Steel Tiger; a limited day and night US air campaign against enemy troop and supply movements within the panhandle of southern Laos. It joined with a strictly daytime operation called 'Barrel Roll', which had begun on





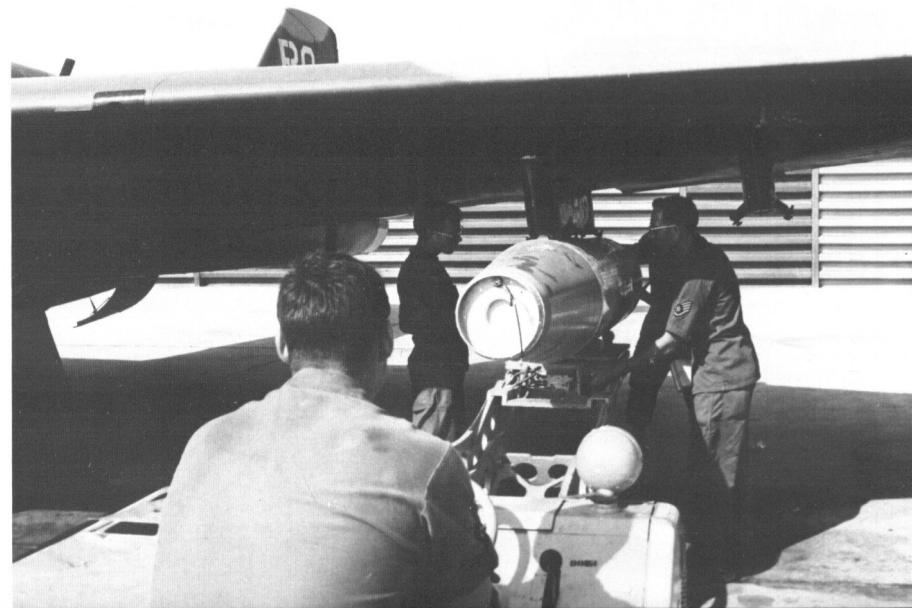
Above left: To protect the night formation by detecting hot missile sites, Douglas EF-10Bs from a Marine squadron at Da Nang joined the mixed group of aircraft for night interdiction attacks.

Left: South Vietnam, showing bases associated with B-57 operations.

Above: Like clockwork, another Canberra leaves Bien Hoa to seek out the enemy and unleash its deadly load. This airplane, 915, was equipped with four M39 20mm cannon with 290 rounds totalling 1,160 for the airplane. Earlier aircraft from 52-1493 thru' 575 were equipped with eight M3.50cal machine guns of 300 rounds each, totaling 2,400 rounds for each aircraft. /USAF

Centre right: Final check of 500lb GPs on the bomb bay door is made by the navigator of this B-57 just prior to take-off. While the low stance of the Canberra eased most maintenance tasks, its low bomb bay gave little working room for loading and inspecting bombs. /USAF

Bottom right: Armourers attach 750lb napalm tanks to the outboard wing stations of this B-57. Technicians are Gene Allard, Bill Benson, Bob Walker and Delmar Thaden. Napalm was an effective weapon against area targets such as Viet Cong villages, helping to keep the enemy on the move and off balance as much as possible. /USAF



3 March aimed against Communist Pathet Lao and North Vietnamese troop movements. By December 1965, 'Tiger Hound' would become another familiar term well remembered by B-57 crews for strikes along the vast network of the Ho Chi Minh Trail, all identifying areas for interdiction missions of enemy supply routes.

Eventually these night interdiction missions were extended into North Vietnam, and the first of these took place on 21 April 1965. The mission got underway when Capts Fred Huber and Howard Greene got their Canberras airborne in this flight of two. Ninety minutes later they were in the target area, a vast spiderweb of supply routes leading south from the city of Vinh, mid-point between Hanoi and the DMZ. At this time, the C-130 flare ships had not been approved for North Vietnam missions, so each B-57 carried MK-24 flares as well as six 500lb bombs and eight Mighty Mouse rocket pods containing seven 2.75in rockets each. Attacks were made against a wooden railroad bridge and a concrete span bridge just south of Vinh. While attacking this latter bridge, heavy AA fire erupted, and

since they had expended their ordnance, the crews were more than ready to vacate the area and head their B-57s toward Da Nang for a fuel stop. Navigators Dick Ryan and Tim Cockburn debriefed the mission at Da Nang, indicating probable success, however a more reliable observation was hampered by the heavy AA fire. In the weeks that followed, only six missions of this type were flown in North Vietnam while the B-57s were assigned at Bien Hoa.

Night missions were considered hazardous for various reasons. Vertigo was a primary cause arising from the loss of visual reference with the horizon by the pilot. Other factors included high terrain, inaccurate maps, and reduced visibility due to the bright flares destroying the crew's night vision. Many times the crews that flew these missions had to fly two or three nights consecutively which when coupled with the fact that they had to sleep in 90deg heat during the day produced a very special hazard. It was due to the dedication and skill of the crews involved that no losses were experienced during these initial night operations.

Below: A dolly of M-117s; 750lb GPs stand ready to be loaded aboard these B-57s at Da Nang in May 1966. The Canberra's bomb bay and wing racks can carry a variety of bombs. Space, not load carrying ability, is often the determining factor for these numbers./USAF



The Bien Hoa Holocaust



For the crews of B-57s that flew in Vietnam during this time, the name Bien Hoa has unpleasant overtones that bring to mind a devastating, never to be forgotten disaster. This tragedy occurred on Sunday morning, 16 May 1965 when Capt Charlie Fox and his navigator Vern Hayes were about to start engines and lead Jade Flight, a flight of four aircraft, on an out-of-country strike. The time was 08.15hrs and three other B-57s making up Paget Flight had already taxied out for take-off. Without warning, Fox's airplane, fully loaded with four 750lb GPs under the wings and nine 500lb GPs in the bomb bay, exploded in a ball of flame with a concussion that threw debris into surrounding aircraft with shattering force. Capt Howard Greene in number four of Jade Flight was away from the rest at the east end of the ramp. He saw the white cloud of smoke and both he and Lt Burbank ducked to avoid fragments, then abandoned their aircraft and ran past the fuel bladders, leaped over the concertina barbed wire (with their seat-parachutes still on) and reached safety in the ditches east of the ramp. The flying bomb fragments and cannon shells caused a chain of explosions that enveloped the ramp in less than one minute. The members of Jade Flight – strapped in their cockpits awaiting engine start time were: Billy Shannon, Jim Underwood, Charlie Fox, Vern Haynes, Art Jepson and Lee Wagner – all perished. Capt Any Kea was killed by fragments as he was walking from his aborted B-57, having been number four in the flight that just departed. His navigator, Lt Barry Knowles was knocked flat by the blast and

received a severe cut across his nose and face. Unable to see, he was rescued and driven away by the maintenance line chief, Senior Master Sergeant Leon E. Adamson who himself suffered multiple shrapnel wounds and severe burns. After a critical and long recovery he was later given a medical discharge. Sergeant Adamson's action illustrates the dedication of the maintenance and armament men of the Air Force and the Canberra squadrons that gave untiring service throughout the years.

The explosions hurled fragments as large as coke bottles into the cantonment area almost a mile from the ramp. An entire J65 jet engine was thrown a half a mile. Ten B-57s,* 11 VNAF A-1Hs and one Navy F-8 Crusader which had landed only minutes before the explosion were destroyed. Besides the seven crew members killed, 13 members of the 405th ADVON 1 maintenance squadron perished, and eight Vietnamese from Bien Hoa brought the total dead to 28, with 105 wounded. The base was a disaster, and four B-57s returning from a raid were diverted to Tan Son Nhut as were the three that had taxied prior to the blast and had escaped damage. Casualties may have been even higher for ground crews had it not been for the arrival shortly before the blast, of an unfamiliar Navy plane, the F-8 Crusader, which attracted curious Air Force crews away from the bombers.

Above: A tightly parked condition prevailed at Bien Hoa even after the mortar attack in November 1964. To have constructed revetments would have necessitated reducing the bomber force at Bien Hoa by half. Unfortunately, that half was destroyed on 16 May 1965 when a ramp explosion took 10 B-57s and killed 28 servicemen – a high price to pay.

*Nos 568, 867, 871, 873, 893, 904, 913, 915, 930 and 937.

Tan Son Nhut

To appear not to miss a lick, the men of the Canberra squadrons in Vietnam immediately set up shop at Tan Son Nhut Air Base with the seven aircraft that were diverted there after the Bien Hoa explosion. Ground crews from Bien Hoa were moved to Tan Son Nhut by bus later that day and in four days the bombers were again attacking the enemy. Their use was only on a limited basis, primarily to show the Viet Cong that their 'hated' Canberra squadrons had lost none of their punch.

Realistically, though, the force was badly hurt. The loss of aircraft, crews, maintenance personnel and equipment, all contributed to the reduced capability which plagued ADVON 1 for several days. Their past record was hardly anything to be ashamed of however. The wartime rate for the 18 B-57s maintained in Vietnam was placed at 378 sorties, yet they actually flew 552, which was 41% above the wartime rate. Each B-57 was expected to fly on the average of 84hr a month as a wartime

figure, giving ADVON 1 a total of 1,512hr to fly for the airplanes assigned. Instead, they flew 2,200hr, including two courier aircraft, which was 46% above the wartime rate. The men of the 8th and 13th were tigers, and nobody knew it better than the enemy.

Operating out of Tan Son Nhut as a combat base was not easy for a number of reasons. This was Saigon's international airport which not only handled vast amounts of commercial traffic, but was also a major military base with an over abundance of varying types of commercial and combat aircraft. One of the most chaotic in the world with its constant flow of arrivals and departures, the airport handled a million pounds of cargo daily. It was two-thirds surrounded by thickly populated suburbs of Saigon, all within easy mortar range of the runways. Fifteen thousand civilian employees meandered around the base daily, making security a nightmarish headache. Faced with this congestion, Canberras returning from a strike had difficulty not only

Below: A lineman guides 'Red Lima' out of the parking spot and sends it off on another strike against the enemy. The maintenance abort rate for B-57s was amazingly low compared to other aircraft types. This not only spoke well for the airplane, but for the dedication of the men who maintained them. *USAF*



in entering the heavy flow of air traffic, but delays on the heavily travelled taxiways were costly in time. Ground crews needed access to the B-57s as quickly as possible for they had to reservice and rearm some of them for a second and often a third mission in the same day. Because the airport was so saturated with airplanes, the B-57s had to be parked on PSP (pierced steel planking) pads. Due to the possibility of ingesting dirt or other foreign objects into the air intake, it was necessary to tow the aircraft on to a taxiway for engine start. This not only made operations slower, but it blocked other traffic as well.

Two tents were pitched by a taxiway to house both operations and maintenance, and the dirt and humid heat made working conditions almost unbearable. Though war is certainly a deadly serious business, humour is also important at times when men, witnessing the fall of their comrades, but never growing accustomed to it, must continue on their assigned missions. Such a saving sense of humour flashed briefly when a high ranking officer approached the B-57 crews with a question a few days after the unit moved into its reduced operation at Saigon. 'Do you really mean,' he asked, 'that you are running a combat operation out of these tents on a shoestring like a bunch of gypsies?'

'Yes sir,' he was told, 'but to tell you the truth, we need the work.'

Morale was on the upswing.

Improvements with the situation were few if any, but like most difficulties, the crews learned to live with them. The operation was to be a temporary one as the plan was to move the B-57 operation back to Bien Hoa as soon as base repairs were made.

In the meantime, two Air National Guard units at Reno, Nevada, and Louisville, Kentucky, must have been very busy preparing seven and two B-57s respectively for ferry flights across the Pacific as replacement aircraft. In just four days after the Bien Hoa explosion, these airplanes were en route to Clark Air Base in the Philippines. It was at this time that a critical shortage of bomber type B-57s were beginning to be felt within the Air Force inventory. Having an ear always tuned to things concerning B-57s, I heard that The Martin Co was asked to once again resume production of the B-57. They could have used the work - but they declined, primarily because jigs no longer existed for the airplane that had been out of production for more than 10 years. It would have been too costly to have made new jigs for limited production. The story also got back to me that one general officer in the Pacific suggested using RB-57As in the ground support role to replace losses. This sounded like history repeating itself, having to learn again that the rounded canopy would not optically handle a gunsight. Fortunately nothing more was heard of this suggestion.

While temporarily at Tan Son Nhut, Canberra crews flew an average of eight daytime sorties within South Vietnam and three missions per night over North Vietnam on armed reconnaissance. One of these crew members was Maj Frank 'Smash' Chandler, a veteran navigator with the 13th Bomb Squadron. 'Smash' tells of an interesting operation when Canberra crews were among the first





Above: Due to heavy ground losses of B-57s in Vietnam, 20 B-57s were drawn from a variety of duties within the Air Force and returned to Martin in late 1965 to be readied for combat. Among these were 12 B-57Es, originally assigned to tow target duties. Under the tail of the aircraft in the foreground can be seen engine tailpipes, aft nacelle sections, tail cone, elevator and aileron. /Martin

Top right: Wheels begin to retract as 882 leaves the runway. Not having bombs on board, this Canberra of the 8th BS may be returning to Clark to be replaced in the combat zone by a crew and aircraft from the 13th BS./USAF

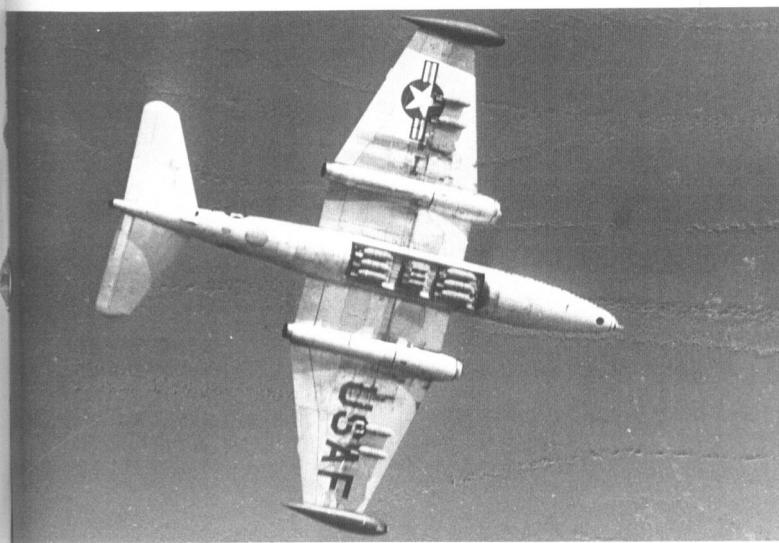
Centre right: A B-57 with its bomb bay door already rotated and open peels off for an attack. On the door are six 500lb GPs fore and aft, and three 260lb frags. On the wings are also 500lb GPs. This unidentified Canberra was once an RB-57B from the sighting window under the nose.

Bottom right: A belly full of bombs, plus loaded wing stations means a lot of trouble for the enemy. Canberras normally dropped one or two bombs per attack pass. With two to four B-57s in the attack pattern on one target, this immobilised the enemy – often permanently – during what seemed to them as an endless attack and rain of bombs. Note smoke stains under wing from 20mm cannon. /USAF

called in to aid the stricken Special Forces camp in South Vietnam at Dong Xoai, in June 1965, when it was partially overrun by a regimental size force of the enemy. The VC armed with a staggering array of 81mm mortars, machine guns, recoilless rifles, and flame throwers, had taken advantage of the low clouds and darkness to launch an attack. By morning, when airpower could be used, the enemy had overrun the camp's airstrip and occupied half of the camp itself. In spite of a goof scattered-to-broken ceiling obscuring the target, the Canberra crews elected dive bombing to ensure accuracy. The initial drops destroyed six Viet Cong anti-aircraft sites. As a result of the B-57 flak suppression, the A-1 Skyraiders attacking the approach routes to the compound were able to halt the Viet Cong drive temporarily. The Forward Air Controller at one point called for tactical support against 'anything moving outside the compound walls.' This close air support was later credited with breaking the enemy attack and reducing friendly casualties. One B-57 pilot, Capt Russell P. Hunter, was wounded during the Dong Xoai battle when a .50cal bullet entered the bottom of the fuselage, ricocheted several times, finally striking him. In shock, severe pain and bleeding profusely, he 'babied' his aircraft back to Tan Son Nhut, his navigator talking to him continuously to keep him conscious. Following a successful landing he was pulled unconscious from the cockpit and taken to the hospital. What happened after that has become a legend with the action in Vietnam. Russ regained consciousness in the emergency room and slipped away unnoticed. He somehow made his way to the flight line and was apprehended in a severe state of shock trying to get into another B-57. All the way back to the hospital he demanded to be released because 'I know where they are now and I'm going to get them.' (This courageous pilot was shot down in Laos seven months later and not recovered.)

The B-57 was proving its ability to sustain combat damage and return its crews to safety, although there were some that did not make it back. It was a noteworthy occasion when the first crew ejected from a B-57 after sustaining major damage and was safely recovered. This first incident occurred on 8 June 1965 when 882, piloted by Capt Gordon Nelson with his navigator Capt James R. Carnes, was hit on a strike mission in the Delta west of Can Tho. Here is Nelson's report of the incident:

'I was engaged in a close air support mission, about 80 miles south of Saigon. I was number four in a flight of B-57s. As I rolled in on my third dive bomb pass, the left wing burst into flame. After advising the flight that I had been hit, I shut down the engine and activated the fire extinguisher. The fire did not go out. Capt Carnes then said he thought the fire was in the wing tank. We decided we had done as much as we could, and that it was time to leave the aircraft. Carnes was to blow the canopy and eject first and I would go as soon as I could after the canopy went. Jim delayed slightly and I went before him (he later said he was marvelling at how well the canopy came off). His equipment worked perfectly, but my lap belt did not disconnect. I found this out later as the horizon was spinning by my eyes and the seat would not kick away. I pulled the belt manually and then the "D" ring. The canopy opened and deployed perfectly, and I removed my mask and looked down at the craters from our bombs. I was expecting the Viet Cong to shoot when suddenly two armed Army helicopters were on each side of me spraying the woods with machine gun fire. I slipped the chute to get on the other side of a small canal and landed on a grass house in a village. The village was deserted and after getting out of my gear I saw a smoke grenade that had come from one of the choppers. It landed in a clearing near the village and I ran toward it. Jim was already on board. It took four minutes and



nineteen seconds to get us – it seemed like four hours!

According to John Kendrick, who was the lead navigator for the flight led by Ben Stone, they spotted the .50cal gun position at the side of the attack course that had caused all the trouble. John wished it to be recorded that 'due punishment was dealt to the gun position and its occupants for downing their friends and any that might follow.'

All losses are tragic, some more than others because of the circumstances and kinship felt with the men involved. One of these occurred on 29 June 1965, following an air strike in support of Vietnamese Rangers in contact with the Viet Cong. While on his last strafing run, 'Bud' (Samuel P.) Chambers in 895 was hit by ground fire, but there were no serious indications of trouble. En route home, his wingman observed several six-inch holes in the left wing and a few close to the compressor section of the engine. Fuel was streaming from the wing although Bud reported that all indications in the cockpit were normal. A straight in approach was established for Tan Son Nhut. The gear was lowered and everything was still normal as verified by the wingman, except that fuel continued to come from the left wing. A safe landing seemed assured as Bud was on final approach and he was cleared to land. As the wing flaps started down, the flow of air was disturbed and the streaming fuel was sucked through holes near the hot engine and exploded, causing the left wing to break off the airplane. Bud and Bob Landringham, his navigator, ejected instantly at a low 700ft altitude – as the airplane rolled inverted. Bob struck the ground while still in his seat, and Bud's chute was seen to stream out as he hit the river. His body was recovered two days later. This incident touched so many, that a new BOQ building being constructed at Clark AB was named 'Chambers Hall' in his memory.

Da Nang and the DOOM Pussy

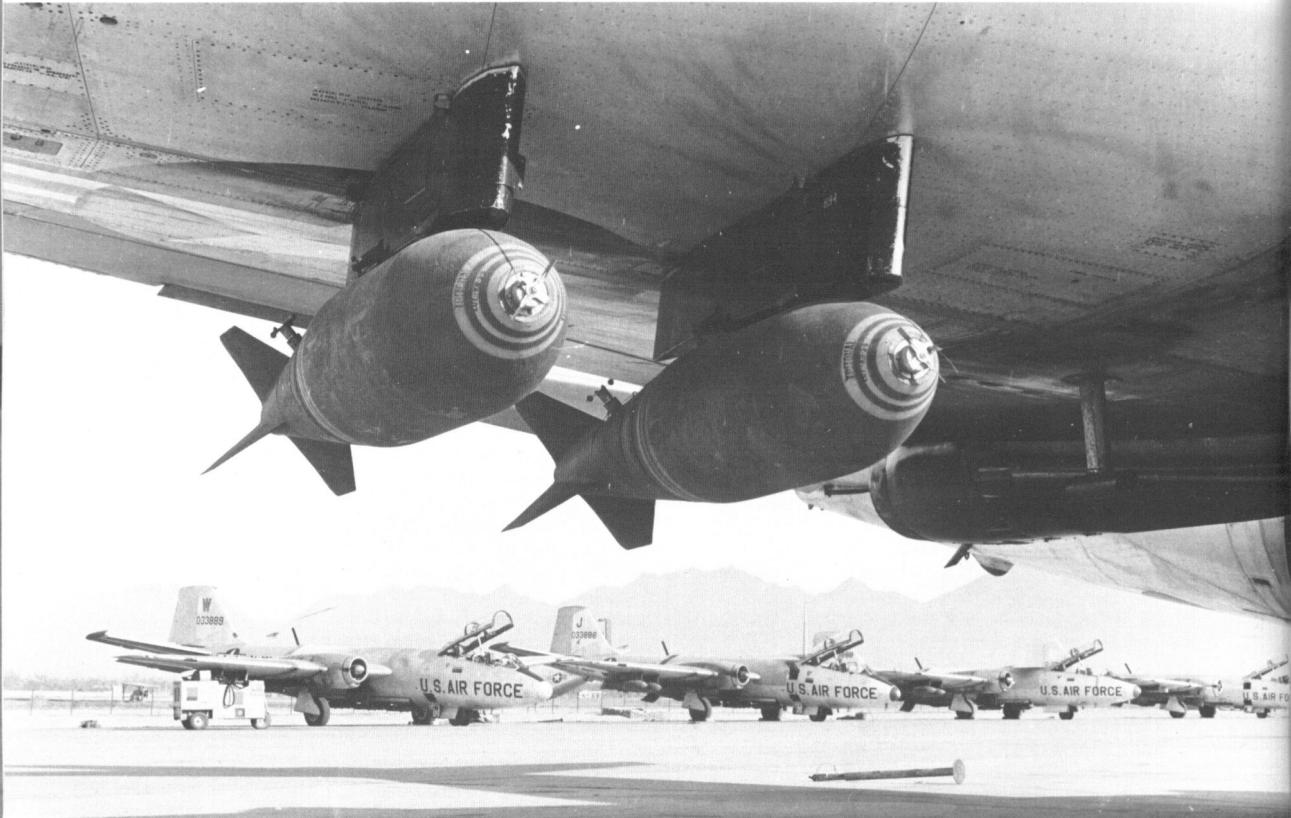
The move back to Bien Hoa from the six weeks' stay at Tan Son Nhut did not materialise. Instead, the B-57 operation was moved in late June 1965 to Da Nang Air Base, a location much closer to the DMZ. This was a growing base, the largest in the northern portion of South Vietnam, situated on sandy terrain just outside the big port city of Da Nang. This new location provided greater working room for the Canberras and better living conditions for their crews. For the 8th and the 13th, this was the beginning of a much smoother running combat operation. When deployed at Da Nang, they came under the operational control of the 6252nd Tactical Fighter Wing, which became the 35th TFW about a year later.

The most noticeable change in the operation was the placing of one entire squadron of B-57s with all their support at Da Nang on TDY (temporary duty) away from Clark for 60 days at a time, while the other squadron remained at Clark and accomplished training for their

return to Da Nang. This provided a more equitable arrangement for the crews and continuity in the combat zone, for there were no daily crew rotations to contend with.

This system began on 21 June 1965 when members of the 13th left Tan Son Nhut and were replaced by a contingent of the 8th Bomb Squadron. They were to join the parent organisation at Da Nang when it moved there from Clark as a unit. That date slipped from 28 June to sometime in July due to delays of a F-100 unit being transferred to another base. In anticipation of this move and to reduce the distance to and from targets in North Vietnam, the night bomber force of the 8th had moved to Da Nang on 18 June. Col Danny Farr was in command at this time, having taken that position the previous month. This rotation of complete squadrons brought an end to the acronym ADVON 1, which symbolised only a composite of both the 8th and the 13th Bomb Squadrons. The B-57s were so well known on the tactical scene, that after a few

Below: The move to Da Nang in June 1965 took place before aircraft revetments were constructed. Ramp space was more in keeping with bomber operations than on earlier bases. Wing racks of these B-57s hold 750lb tritonal filled bombs.
/USAF





Above : Da Nang was a growing base, but with the move there came a stabilising effect on the B-57 operation. This view taken in late 1965 looks west with revetments in the centre to house the Canberras.

Right: This unusual picture taken in early 1966 shows an EB-66 leading a formation of B-57s deep into North Vietnam at the instant of bomb release. This was a 'Combat Sky Spot' mission where radar was used for target acquisition and command for bomb release is given by voice or electronic signal. EB-66s could detect active missile sites for the formation. Canberra missions of this type, however, were few and were replaced by B-52 raids.
/D. Beggerly



months, nondescript call signs such as Sofa, Kay, Newt, Dark, etc, gave way to the more affectionate sounding 'Yellow Bird' or 'Red Bird' for the 8th and 13th respectively, depending on the squadron colour of the unit then in-country.

Missions of varying types for the B-57s made the war anything but a boring pastime. One of these was flak-suppression missions with the C-123 Ranch Hand aircraft. Americans, by nature, are not jungle fighters. To enhance our advantage to fight the war on our terms, the jungle growth along the enemy's supply routes was sprayed with defoliate, thus depriving him of this protective visual cover. These defoliation sorties were flown low and slow over some of the roughest terrain in the world for this type of flying. Hits from ground fire were the rule rather than the exception.

The presence of the Canberra in company with the Ranch Hand aircraft was a deterrent factor by causing the enemy to think twice before opening fire. When ground fire was encountered, a crew member in the C-123 would toss out a smoke grenade marking the spot and the B-57s would unmercifully saturate that area of the jungle with their guns and 260lb fragmentation bombs.

The enemy's special hatred for the B-57s was often evident in the testimony of VC defectors. When the VC were interrogated by American-South Vietnamese intelligence as to why they defected, many replied that the primary reason was overwhelming American

Below: The Doom Pussy patch was worn only by those more experienced crews who flew night missions 'up north'.
D. Beggerly

Bottom: These trailers provided air conditioned and less noisy sleeping quarters for the four crews required to fly each night. At Da Nang even crew facilities began to improve.
D. Beggerly



and Vietnamese air power. They exclaimed that there was no place to hide, and were always kept on the move. Their tactics were continually being modified because of this, and the pounding from the air was unbearable. When interrogators showed defectors the silhouettes of aircraft, most of them immediately pointed to the B-57 as the most despised. 'The screaming bird,' they would say. 'It is the worst. It stays over the target so long. And it never runs out of bombs.'

Weapons so dreaded have a psychological assist – for example, the Stuka dive bomber of World War II, with its deadly accuracy and awesome scream. The J65 engine of the B-57 also has a weird whine all its own. The VC had a contemptible word for the Canberra – *can sau*, which meant 'caterpillar', the little creature that they considered the most loathsome thing in all Vietnam.

Bombs carried by the B-57s throughout the war were fairly consistent in type, but load configuration often varied on the mission and bomb type availability. The wing stations normally carried 4 x 750lb GPs (General Purpose) or 4 x 750lb napalm tanks. On occasion, 500lb GPs, 260lb fragmentation bombs, rocket pods for 2.75in 'Mighty Mouse' rockets, 5in rockets, and night flare pods were carried on the wing pylons. Internal loads ranged from 4 x 750lb GPs, 9–13 x 500lb GPs, or 16–28 x 260lb frags. Mk 81 and Mk 82

bombs with either high drag or low drag fins were common. For some special missions, 1,000lb HEs (High Explosive) were carried. On out-of-country missions, M35 and M36 'Funny Bombs' were most memorable to all the crews that carried them. These fire bombs spread a blanket of hot burning thermite over a large area that sustained their fire for up to 10–15 minutes, lethal for trucks and area targets. From February to April 1966, B-57s were consistently sent out with only one light bomb and half the guns charged. This retained the show of force while the heavy bombs were diverted to fill shortages created by the start of the B-52 raids.

Mission flying times also had a wide range variation. Attacks against designated targets in South Vietnam could be under two hours but averaged two and a half. To the more distant out-of-country targets the average was three hours or more. Night missions into North Vietnam and along the Ho Chi Minh Trail became more numerous while the Canberras operated from Da Nang. As time went on they also became the most hazardous to fly because the abundant radar controlled anti-aircraft guns operated more freely under the cover of darkness. The B-57s were so effective against enemy supply routes at night that it seemed to justify the risk.

Only the more experienced crews flew these missions due to their many complexities. It was not long before these night sorties *up-north* were even given a special and ominous sounding name – 'Doom Pussy Missions'. Crews that flew these missions were entitled to wear the 'Doom Pussy' emblem sewn on the right shoulder of their flying suit. This was an embroidered head of a wide jawed yellow cat with pointed ears and a black patch over his right eye. Clenched in his teeth was the outline of a twin engine aircraft – very much like that of a Canberra. In green letters around the border were the words: Trong Mieng Cua Con Meo Cua Tham Phan, which translated from Vietnamese, reads: 'I have flown into the jaws of the cat of death.' Returning crews, having had a night of it up-north, dodging red-hot 37 and 57mm tracers and technicolour air bursts that seemed to envelop the airplane, simply phrased it: 'I have seen the Doom Pussy.'

This legendary cat got its name from the Da Nang Officers Open Mess, thus: DOOM. On the back of the bar was a tall and slender wood carved cat, placed there for no apparent reason even before the B-57s arrived at Da Nang. While fellow crewmen were up-north on night missions, evading Russian made Surface-to-Air Missiles (SAMS) and radar aimed guns, the cat was turned to face the wall until the safe return of that night's Doom Pussy Missions.



A Few 'Rough Ones'

North Vietnam at night was bad enough, but being there during daylight hours was something else. The situation takes on a different perspective however, when there is the chance to help a downed fellow American aircrewman. This was the case when B-57s were called upon for the first time to provide RESCAP (rescue combat air patrol) for a downed F-105 pilot in North Vietnam on 27 July 1965. His downed position was 29 miles west of Hanoi - right where nobody wanted to be, due to the presence of SAMS and automatic AA in this heavily defended area.

Lt-Col Danny Farr, Commander of the 8th, with Billy Boyington as navigator were off the runway at Da Nang at 16.50hrs in response to this emergency. On their wing was Bob 'Whale' Smith with John Hughes in the back seat. The flight of two were vectored by Panama, the radar ground station, to the downed pilot's position and arrived there an hour and eight minutes later after being vectored around known flak positions. The plan was to stay at altitude to conserve fuel, for assistance would not be needed until the arrival of the rescue helicopter. They would then provide fire suppression during the pickup phase.

Time over this hot area dragged on and still no chopper. Col Farr and his flight conserved fuel as best they could but they finally had to leave the area and recover at Udorn, Thailand, which was the nearest airfield at which they could refuel and be ready to assist further if need be. Darkness was fast approaching, but fortunately a second flight of B-57s had taken off 20 minutes after the first as a backup. Gail Manning was leading with Ken Blackwell on his wing. This flight with Phil Mason and John Kendrick as navigators was vectored to intercept the helicopter as it crossed the Laotian border and flew escort with it to the downed pilot's position. It was a race against time now, for shadows were getting longer as daylight was coming to an end. Fortunately the F-105 pilot's radio beeper was sending a strong signal for the rescue aircraft to home in on and little difficulty was had in locating him. The chopper was being fired on but the crew was too busy attempting to unjam the

rescue hoist to direct the B-57s to the point of fire. The hoist refused to cooperate so they had to land in a nearby clearing so that the pilot could climb aboard.

During this time the two B-57s became the centre of attraction of the local AA guns and received some damage which perhaps drew the enemy's fire away from the rescue operations. The rescue was completed with no time to spare, for as soon as they were able, Gail Manning took his flight direct to Udorn, where they landed with only emergency fuel remaining.

Missions up north in the relatively slow flying Canberra were not one of the best occupations for these aircraft in this heavily defended area. The only satisfaction with this type of mission was in knowing they had aided in the safe recovery of one of their own people. Perhaps this was the incentive for the Jolly

Below: Clark Air Base in the Philippines was safe haven for the 8th and 13th Bomb Squadrons which deployed from here on temporary duty to the combat zone throughout most of the war. The base provided rear echelon maintenance for the Canberras on a time cycle for the rotational squadron at Clark. This was the B-57 ramp supported by their parent organisation, the 405th TFW. Squadron Operations building is centre rear./D. Beggerly



Left: Very little publicity was given to the B-57s and their crews because so many of their combat missions were of a classified nature in Laos, Cambodia and North Vietnam. Consequently it was a little known fact that these Canberras operated continually in the air war for more than five and a half uninterrupted years, then for two more years as B-57Gs./USAF

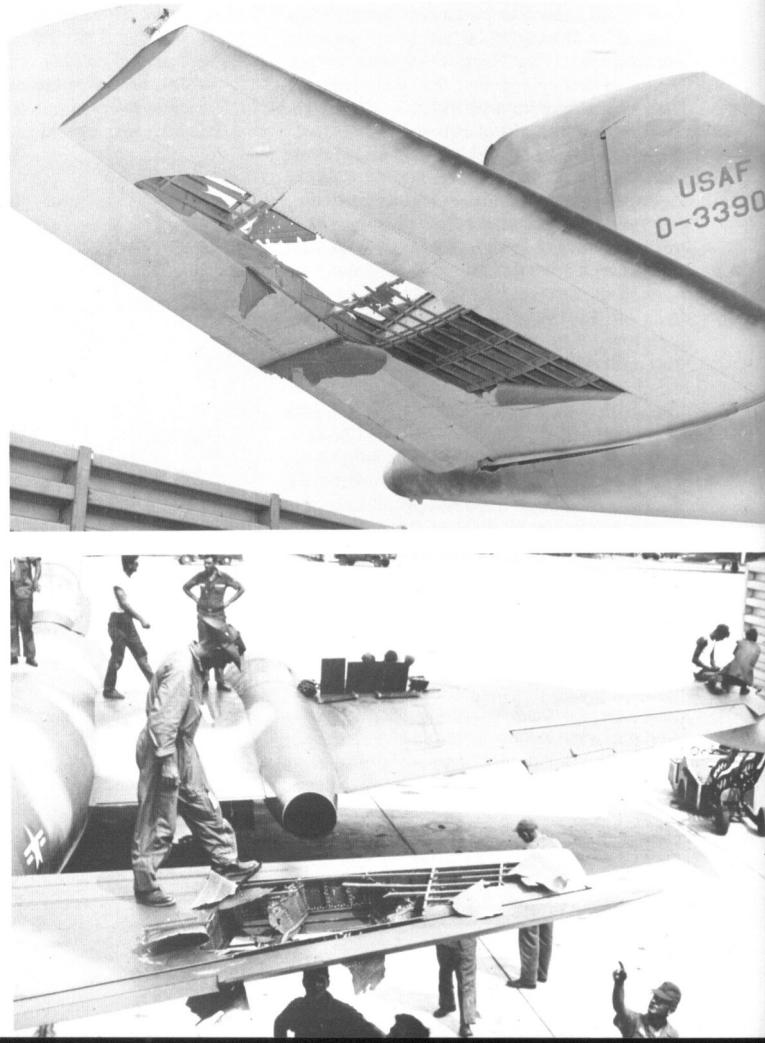
Below: The results of a hot night over Tchepone, Laos in March 1966, and proof that the structure of the Canberra could take punishment. This B-57 was ready for combat the next day, having had its stabiliser replaced by one from 550 which bellied in from combat damage a few nights before./E. Youngs

Bottom: Another view of 905 being checked over after a safe return to Da Nang. Fortunately for Art Kono and Paul Stenseth, they were far enough ahead of the anti-aircraft round that otherwise could have hit the engine with more disastrous effects./USAF

Green rescue helicopter crews doing this on a daily basis; a job considered the most hazardous of all flying jobs in combat.

Then there was the case where one B-57 made a very deliberate attempt to shoot another B-57 out of the sky. This unusual situation took place on 6 August 1965 when 919 received extensive battle damage during a daylight strike near the seacoast town of Nha Trang along the central coast of South Vietnam. It was all that Larry Horacek could do to keep his crippled bomber under control before he and his navigator Bob Johnson would have to eject. Due to the population in the area, Horacek wanted to have his B-57 headed toward the open sea before leaving it, especially since it was still loaded with bombs that he could not release. As they crossed the shoreline, both crewmembers ejected, each making a safe water landing and were picked up within a few minutes by a helicopter.

This is not the happy ending of the story, however. The stricken Canberra had ideas of its own. Apparently the left engine lost power, for the airplane began a gentle left turn which if continued would turn it back towards land. In desperation, the pilot of the second B-57 in the flight, closed on the runaway aircraft and began firing, hoping to shoot it down while still over water. Guns on Canberras are not aligned for air-to-air combat – but are deflected downward slightly for ground strafing. This attempt to achieve an air-to-air kill was unsuccessful and the pilot had to break off the attack for fear his rounds would strike inland as the crippled bomber had now completed its turn. Moments



later the pilotless B-57 slammed into the heart of Nha Trang, killing 14 Vietnamese, injuring 67 others, and also injured eight Americans. Four of the bombs exploded on impact, but fortunately the other 12 did not.

Eight months later, Larry Horacek was shot down again, this time while escorting a defoliation mission north-west of Dong Hoi, in North Vietnam. As before, he was rescued by helicopter, and finished out the remaining months of his tour - *very carefully*.

Combat missions, like anything else repeated frequently, can be expected to become routine by following a fairly consistent pattern. This was expected to be the case when Tout 21 and 22, two B-57s from the 8th Bomb Squadron left Da Nang on 20 October 1965. This was a routinely scheduled in-country strike on a preselected target in I Corps along the 'Street Without Joy', north-west of Da Nang. As usual, soon after becoming airborne, the Canberra crews changed their radios to the Direct Air Support Center's frequency and checked in with Big Control. This agency had operational strike control

over tactical aircraft in the I Corps area, and would pass along new information pertinent to the strike mission.

The routine of this mission ended here however, for as soon as contact was made with the DASC, they were given a 'Flaming Arrow' divert, meaning that a Special Forces Camp was under siege and needed immediate close air support. Turning south, the two B-57s proceeded to the Plei Mei Special Forces Camp some 20 minutes away where a FAC was already on the scene, ready to direct attacks. Smoke from a downed helicopter and U-6 Beaver readily identified the spot for the two B-57 pilots. The Viet Cong forces were estimated to be of regimental strength, since they did not retreat under the helicopter air attack, and had already inflicted heavy casualties on the camp. Heavy ground fire was observed by both Canberra crews and was also reported by the FAC. Cloud cover in the area had bases at 4,000ft which prevented the bombers from making the more accurate high angle dive bombing attack, so the crews elected level bombing runs at 2,200ft and 350kts.

Below: Pulling up from this attack, Yellow Bird 31 of the 8th Bomb Squadron just released its bombs on a Viet Cong concentration in the area of the smoke at upper left. This was the critical point for the Canberra when closest to the ground and subject to ground fire.
/R. Hunter



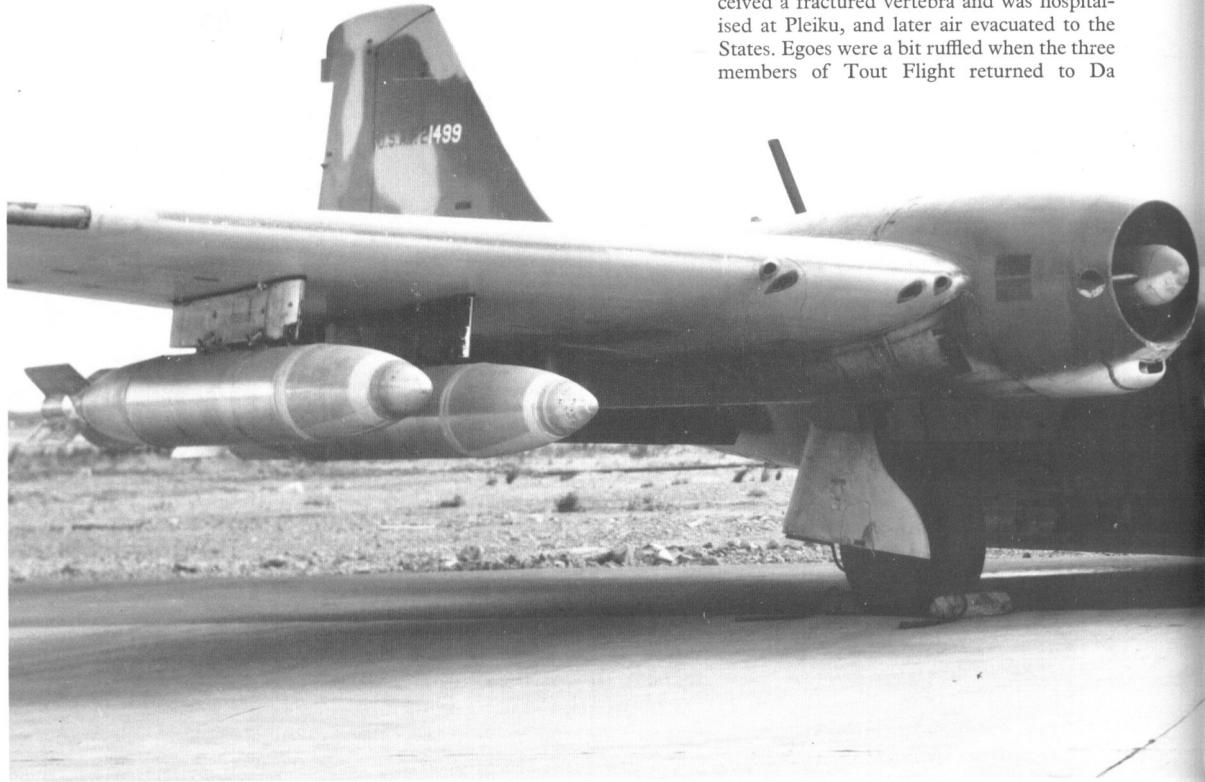
Below: One of 20 B-57s reconditioned in 1965 by Martin to replace combat losses in the war zone. From test projects to combat, 499 is shown here in war paint and has 750lb napalm tanks on the wings. Canberras took on camouflage beginning in December 1965. Note openings for four .50cal machine guns outboard of the engines. /USAF

They released one wing bomb at a time on known enemy troop emplacements. After four or five passes by each aircraft, they initiated strafing runs covering strategic areas of concealment where the enemy was likely to have vantage points.

In the lead aircraft, 920, was Maj Jerry Hamilton with Harold Holzapple as his navigator. On their third strafing pass, the Canberra took numerous hits from a .50cal machine gun emplacement. A bright orange ball of fire appeared briefly over the right wing and the tip tank and part of the right wing left the airplane. The B-57 was seemingly still under control – for the time being at least. Maj Doug Beggerly and Lt Dick Lewis in the second B-57, 931, having seen where the ground fire came from, directed their next strafing pass on that position. As they pulled up from the run, they took a hit with a resounding explosion in the cockpit between the two crewmember seats. The cockpit immediately filled with smoke. The hit rendered the oxygen system useless, making breathing under these conditions almost impossible. When Beggerly got the cockpit cleared so he could see and breath freely, it became apparent that his electrical navigation equipment was

also inoperative. But now too – Jerry Hamilton's problems were beginning to multiply. With a jaggedly split right wing tank and a hung bomb on the left wing station, the airplane became uncontrollable when the airspeed was allowed to decrease. Nothing would jettison, not even the full internal load of 260lb fragmentation bombs. There was no other recourse than to bail out while the airplane was still under control. Setting the airplane in a climb as they headed it toward Pleiku, where rescue helicopters were already summoned, both crewmen punched-out just before the airplane became uncontrollable. Despite the damage to his own ship, Beggerly circled the area of his downed teammates while directing the rescue operation and providing air cover until they were safely aboard the rescue helicopters.

With half the problem solved, Doug could now turn attention to his own. Not knowing the full extent of his damage, he decided to land at Pleiku, which was all but in sight of where this incident took place. His hydraulic system was also at zero which required him to use the emergency hand pump system to lower the landing gear. After a successful landing, there was a welcome reunion for the four at Pleiku, although Maj Holzapple received a fractured vertebra and was hospitalised at Pleiku, and later air evacuated to the States. Egges were a bit ruffled when the three members of Tout Flight returned to Da



Nang without their Canberras, seated in the back end of a C-7 Carabou.

In a letter that Doug wrote to me the same day of the incident, he started out with: 'this is now a personal war! I had planned to keep it cool while I was here, but now they have made me mad!' You see – this was Doug's very first combat mission in Vietnam – but it was his third war in the air. For his bravery on this mission, Doug not only received the first Thirteenth Air Force 'Well Done' award to be presented, but also the Distinguished Flying Cross, first Oak Leaf Cluster, for his heroism, and Order of the Able Aeronaut.

As for the outcome of the besieged outpost of Plei Mei, six more B-57s entered the attack that morning followed by other strike forces. After two days of intense fighting and helicopter airlift of support elements, the camp was finally secured.

There have been many acts of heroism among crewmembers of the B-57s that were created by combat situations. Not only do the favourable outcomes of these situations reflect well upon the crewmember's knowledge of their airplane and related systems, but also

that the B-57 could withstand the punishment inflicted by combat damage. Another such situation occurred to 906 of the 8th Bomb Squadron, on 15 March 1966, near Tchepon, Laos. Capt Larry Mason was on a strafing run on enemy trucks when his Canberra was hit by anti-aircraft fire. The damage was so severe that the aircraft rolled almost inverted but held together. After regaining control of his aircraft, Larry's first thought was that he and his navigator Jere Joyner, would have to eject. His cockpit indications showed loss of power on one engine and a fire warning light on the other. Struggling as he reached forward, Jere passed him a blood-stained message which read: 'Hit badly – arm and leg – losing blood.'



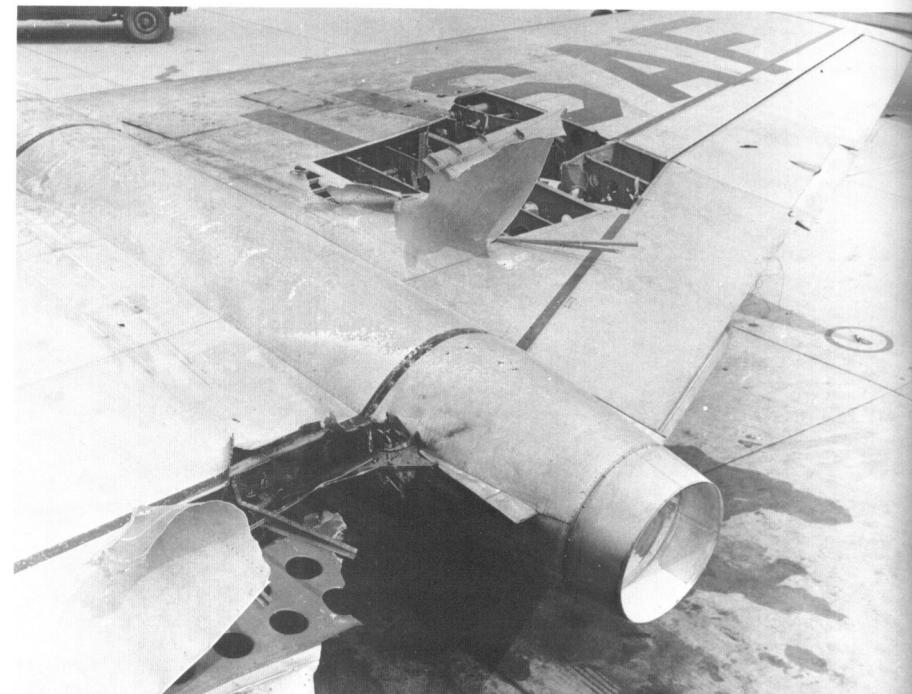
Realising that Jere possibly would not survive bailing out, Larry passed him a tourniquet and gingerly headed his crippled and radioless B-57 to Da Nang. He was successful in reaching the base, but the landing gear indicators showed the left main and nose gear in the intermediate position and the right main gear down. Unknown to Larry was that one of the shell hits caused all three gears to drop down and lock, while the cockpit indication was erroneous. Pressed with getting his navigator to medical aid, yet unable to get a safe gear down indication, Larry placed the gear handle in the up position on this third pass at the field and made what he thought would be a gear-up landing. To his amazement, the aircraft landed smoothly on the extended gear and made a normal rollout. For this heroic outcome that saved the life of his navigator, Capt Mason received the Thirteenth Air Force 'Well Done' Award, the USAF 'Well Done' Award, the Koren Kolligian Jr Trophy for 1966, the Order of the Able Aeronaut, and more importantly - the Air Force Cross, the first in that war to be awarded to a living recipient.

A postscript to this harrowing story is that the Canberra also survived this encounter, thanks to the crew, and the ground maintenance personnel that healed its wounds. After nearly three more years of combat, it was modified as a B-57G and was again returned to combat.



Above: The Canberra could lose a lot of wing and still continue to fly as proven in this view of 906. It was hit in several places throughout its structure over Tchepone, Laos, on 15 March 1966. Cabin pressurisation, electrical and hydraulic systems were also knocked out, yet 906 was able to return to Da Nang./L. Mason

Right: Control was difficult to maintain with this and other damage caused to 906. Pilot Larry Mason refused to abandon the airplane knowing his navigator was seriously wounded, and nursed it back to Da Nang to a safe but harrowing landing. After repairs, the Canberra carried on with the fight and was later converted to a B-57G./L. Mason



VNAF Flies B-57s

Front page headlines on the Saigon Sunday Post for 1 August 1965 proclaimed: 'B-57 Bombers For VNAF.' This first public announcement stated that 'The Vietnamese Air Force would soon have its first jet bombers,' and that 'four B-57 twin jet Canberra bombers will soon be turned over to them.' The United States was reluctant to equip VNAF (Vietnamese Air Force) with jets for fear of further escalating the war. However, the US was reminded that they had equipped other nations friendly to them with jets, so this pressure from Saigon, coupled with a need to boost morale of the South Vietnamese people prompted new thinking. The consoling factor at that time for US war planners was that the jets in VNAF would be a token force at the most. To what extent this programme was expected to develop must be left to conjecture, but what was not planned was that in less than seven months after this announce-

ment, the VNAF B-57 programme would end, abruptly, and without fanfare.

The programme actually got underway as early as May 1964, only one month after the B-57s arrived at Clark. 2nd Air Division, acting as liaison, conveyed the message that called for introduction training in B-57s for six VNAF officers. It was not long before VNAF Maj N. N. Bien, and Capts Tuong and Long arrived at Clark to begin this training. The American instructors were relieved to learn that the Vietnamese pilots had some jet experience in T-33s, either obtained in France, the US, or both. Heading this training programme was Capt Don Nation, who recalls that after the initial problem of the pilots transitioning from the Douglas A-1 Skyraider to a twin engine jet, he was most emphatic that these officers were excellent pilots. All three wore *500 combat mission* patches which gave no indication as to

Below: The often present low clouds hang on nearby mountains at Da Nang on 29 October 1965, as 541 has just been prepared for a strike against a suspected VC stronghold in central Vietnam. VNAF crews and their aircraft were under the operational control of the American forces and shared the base facilities of the American bomber squadrons.



how much additional experience lay behind them. (The counting of combat missions ended after 2,000 unless they received battle damage.)

Training for the next three officers proved to be very interesting also. Unlike the first group of three, this training – which the directive message referred to as ‘Familiarisation Training’ – was to be accomplished at Tan Son Nhut instead of Clark. It soon became obvious why, for these students were none other than Nguyen Cao Ky, Commander General of VNAF (later to be Premier of the Republic of Vietnam), Col Luan (later Gen), in charge of Internal Security for Ky, and Maj Van, Chief of the VNAF Command Post. With one dual control B-57C and training aids in hand, Don Nation got the programme started, thinking ‘Familiarisation Training’ meant about two rides for each of the officers. What 2nd Air Division intended was about 30 hours for each and the programme to be accomplished in about 30 days. It was not long before Don got additional help.

Ground school was finished in about three days. One and a half days were spent on the very hot ramp with aircraft and cockpit familiarisation, and then into the air to apply the knowledge learned on the ground. Flying went on for three or four days and then came time for a change of pace. As guests of Ky, the entire contingent went to the Central Highlands for a bit of Bengal tiger hunting. Don has many yarns to tell of this unusual hunt – on the backs of elephants at night with battery operated spotlights – but that is another story. Tigers were not encountered, but they did manage to bag three deer.

More than a year passed before the announcement was made that VNAF would receive B-57s, and a formal ceremony was arranged for the 9 August presentation to the Vietnamese Government. When those who attended arrived at Tan Son Nhut Air Base, there was already one B-57B, 530, in the spectators area which had been flown down from Da Nang the day before by Majs Sims and McCord of the 8th Bomb Squadron. This Canberra was void of all US markings, except for the shiny telltale area where the letters of ‘U.S. AIR FORCE’ had once been painted. The Vietnamese insignia replaced the US national marking, and the yellow and red Vietnamese flag was painted across the rudder. In front of the airplane was a display of various ordnance loads that the B-57 could carry. (It was not discovered until the evening preceding the ceremony that one 500lb bomb was already fused!).

Before this ceremonial day, Capts Don Nation, Frank Hardee and Harry Zahn, brought three dual control ‘C’ models from Clark so that Ky, now Premier and retaining command



Above: American Canberras were often re-marked with VNAF colours on an ‘as needed’ basis. This required the removal of USAF nose and wing markings, PACAF insignia on the tail, and adding a Vietnamese flag to the rudder, and modifying the national insignia. VNAF insignia was outlined in red with yellow bars. US Air Force serial numbers remained as did the yellow fuselage band of the 8th Bomb Squadron. *D. Beggerly*

of VNAF, and VNAF Captains Tuong and Long could refamiliarise themselves with the airplanes. On the eve of the transfer day, these three airplanes, 849, 883 and 940 also got the treatment of new Vietnamese markings. The reviewing stands that typical hot, humid, August day were filled with representatives of SEATO nations, ambassadors, generals, admirals and other officials – of all sizes and shapes. The three B-57s had taken off well before the spectators gathered, and at the precise moment specified in the programme, they thundered across the field in a high speed, low altitude pass in front of the reviewing stand. In the lead aircraft, 849, about 30 seconds in front of the other two was Gen Ky, with Don Nation in the back seat as were the two American pilots in the other two ships. Ky was an excellent pilot, but since he was unable to participate in the practice fly-bys preceding this event, Don took over at this point for the landing. His humorous comments about the event are worth repeating here:

‘As we neared the far end of the runway, I pulled up in a steep climb with a half-roll and reverse for what I thought would make an interesting entry onto the downwind for landing. We still had a good head of speed, but I fudged a bit and got the gear down at not too excessive an airspeed at about the time I turned on base leg. While doing everything possible to slow down to flap extension speed, yet keep the pattern in tight, I started talking to myself over the hot-mike for the benefit of the General in the front seat, hoping this would reassure him (and myself) that everything was still under control! “Slow down – you (s.o.b.) – s-l-o-w d-o-w-n!”,

Above right: Nguyen Cao Ky, left, Premier of the Republic of Vietnam and Commander of VNAF talks with Brig-Gen Albert W. Schinck, MACV Advisor. The occasion at Tan Son Nhut was the presentation of the first jet aircraft, four B-57s, to the Vietnamese Air Force on 9 August 1965. Capt Tuong, pilot of another Canberra looks on. *USAFAF*

Right: Reflected pride is obvious, especially for VNAF Captain Lan, having just landed at Clark from his first solo ordnance delivery training mission at Crow Valley Range in the Philippines. John Kendrick, in background, was Stan Eval, Navigator and went along, while John Alder, right, had been Lan’s instructor pilot. Soon after, Lan was flying combat missions from Da Nang with the Americans. *J. Kendrick*



I expounded, not knowing that my death grip on the throttles, attempting to get the engines to idle even slower, was also keying the mike button, and my comments were being transmitted. Moments later as I rolled out on final, a very calm American voice from the tower responded to my comments, "Dragon One, - if you have your aircraft slowed down sufficiently - you are cleared to land." This transmission which identified my aircraft, made it clear that I had boozooed! Needless to say, Frank and Harry spent much time pointing out my lack of radio discipline for weeks that followed.'

All three B-57s got on the runway in spectacular form to the delight of the audience (and aircrews). At the far end of the runway, out of sight of spectators, the canopies raised and the three American pilots slid out of the back seats and on to the ground. The Vietnamese pilots taxied the ships to the reviewing area, knowing that their solo appearance would





Left: VNAF marked B-57, 929, taxies past the watchful gaze of an Air Policeman at Da Nang AB. The missing 'U.S.' Air Force normally on the nose is the first obvious indication that this is a Vietnamese Air Force assigned Canberra. One crewmember on board was usually an American, until the Vietnamese gained considerable experience in the aircraft. /USAF



have a prestigious effect upon the press – which it did.

Ky, looking very dapper as always in his distinctive black tailored flying suit, climbed from the cockpit amidst reporters and flashing cameras. He had insisted that the three American pilots, despite their baggy, sweat soaked flying suits, join him at the champagne reception that followed the speech making. This stunned the high ranking attendants from 2nd Air Division, thinking it would compromise the delivery impressions that were made, but they acquiesced. While festivities continued into the evening, three other B-57Bs at Tan Son Nhut were painted with Vietnamese markings and exchanged for the 'Cs'. These dual control models were again painted with USAF markings and returned to Clark where they again took up their vital role of training more pilots and navigators.

Shortly after the presentation day, a transition and weapons delivery school for Vietnamese pilots was started at Clark, more openly than the first. Six additional pilots were selected which soon multiplied to names of 12, along with 12 navigators, and a number of very eager VNAF maintenance personnel. Far more interesting is the fact that two Philippine Air Force navigators were included in this B-57 programme. The reason was strictly political, for it was a US State Department sponsored programme, and in order for the Philippine Government to allow VNAF personnel into their country, they traded the training of two navigators.

The new programme began on 20 September 1965 when Maj Bien, who returned for a refresher course and weapon delivery phase, and Capt Lan began flying at Clark. Three weeks later, Lts Ty and Vu joined them. Each pilot was to receive 70 hours in the airplane with no less than 40 training sorties before

being considered qualified in the Canberra. With the help of Hardee, Zahn and Alder, training moved into the Combat Weapons Delivery Phase. Nation reflects:

'Because of their many years of combat experience already behind them, I think they ended up teaching us in this final phase. They were very good with ordnance delivery. As I recall, it was Capt Long that literally drove Harry "Z" up the wall with his dive bombing. His first bomb was invariably 250–350ft short, then the next ones would be right down the pipe! Long's explanation for this was to scare the enemy into the target area, then really zap 'em.'

Navigator training began 11 October and this responsibility was given to Capt John Kendrick. This training was to familiarise them with the systems they would operate in the back seat of the B-57, and to generally transition their thinking from reciprocating engine aircraft speeds to that of jets. As the crews completed their training, they went to Da Nang and flew their combat missions with either the 8th or 13th, which ever was on station at the time. To gain combat experience in the B-57, each new crewmember flew with an American pilot or navigator, which ever the case may be. Eventually the VNAF crew members were teamed together and flew in VNAF marked B-57s. All the while, their combat missions remained under USAF operational control. There were usually a few B-57s in VNAF markings at Da Nang for these crews, but these ships were changed frequently to meet maintenance schedules for down times.

In the meantime, the VNAF B-57 programme was not receiving the visibility that the Vietnamese Government felt it should. The enemy had not felt the impact of this VNAF bomber force, and such action would increase morale of the South Vietnamese. An appropriate time to rectify this situation came on the Vietnamese Armed Forces Day which was on Friday, 29 October 1965. To highlight the occasion, five B-57s from the 8th Bomb Squadron, then on rotation at Da Nang, were repainted with VNAF insignia, and each carried 13 500lb GP bombs and fully loaded guns. En route to Saigon, these Canberras, manned totally by American crews,* conducted a preplanned air strike on a suspected VC stronghold, making the presence of VNAF bombers known before landing at Tan Son Nhut. After de-arming and reserving,

*Aircraft 929, Sims-Harnage; 545, Beggerly-Matthews; 541, Barnett-Walker; 567, Stanley-Sjogren; and 878, Keables-McCord.

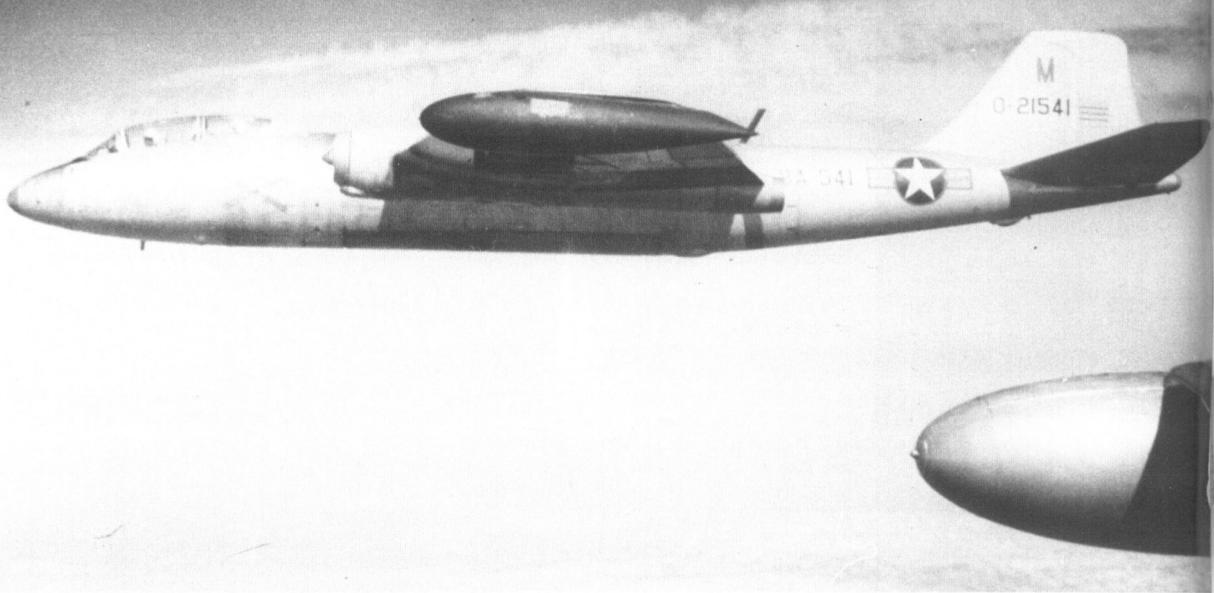
they joined other Vietnamese aircraft in a tight V-formation fly-by over the capital city at a low 300ft, ripping along at 300kts, down the main street of Saigon and over the palace. This jet bomber force was visually part of VNAF, and even more impressive to onlookers was the fact that just a few hours before, they engaged the enemy in combat, punctuating the first strike made by VNAF marked B-57s.

At Clark, the second set of four Vietnamese pilots, but having only two navigators, started their training on 22 November, and it was here that the VNAF B-57 programme began to sag. By the end of the first week in January 1966, many of the aircrews in training complained of various kinds of illnesses which all but brought their training to a standstill. Further complicating matters was a training accident that occurred on 8 January 1966 when VNAF Lt Lom with an instructor pilot lost control of 838 on touchdown when making transition landings at Cubi Point NAS. The airplane became a total write off. It had arrived from the United States only 17 days before. This accident seemed to set the programme back further by lowering the morale of the Vietnamese even more. Some flatly stated that they could not physically perform the manoeuvres required in the B-57. Before a solution to the problem could be reached, however, another accident occurred which had a disastrous effect on the VNAF

crews and from which the programme would not recover. This accident occurred on 23 February 1966, with 512 while it had Vietnamese markings and an all VNAF crew, piloted by Maj N. N. Bien. While on a strike mission, the weather turned bad at Da Nang. Because of hung ordnance and inadequate fuel remaining, Bien elected to recover at Pleiku Air Base. After de-arming and unable to start the engines due to inexperienced VNAF ground crews installing the starter cartridges improperly, the Vietnamese decided to push the airplane by hand. Bien remained in the cockpit intending to guide the airplane with wheel brakes. But hydraulic pressure had not been built up beforehand, and as the heavy airplane began to roll down a slight grade, it became uncontrollable and started off the side of the taxiway. In a freak accident, Bien jumped from the cockpit, stumbled and fell in front of the left main gear which rolled over him causing fatal injuries.

His death stunned all who knew him, for he was well liked and highly respected by both Vietnamese and Americans. Maj Bien had been a driving force and dynamic leader of the VNAF B-57 programme. With his loss, there seemed to be no incentive on the part of the Vietnamese crews to stay with the Canberras. From this point on there was little or no activity by the Vietnamese in the programme, and on 20 April 1966, Thirteenth Air Force terminated the VNAF B-57 operation.

Below: These VNAF B-57s from Da Nang have just rejoined after attacking suspected VC strongholds in central Vietnam on 29 October 1965. American crews were often on board as in this case, but many VNAF pilots and navigators became very effective with their Canberras. For some, however, it was too heavy an airplane for them to handle adequately./D. Beggerly



Phan Rang

While the two B-57 squadrons alternated their 60 day stay at Da Nang, they were attached there for operational control to the 35th Tactical Fighter Wing, an F-100 unit. As higher performance fighters took over the air war to the north, it became more advantageous to place the 366th TFW with F-4 Phantom IIs at Da Nang and relocate the F-100s. The new home for the 35th TFW became the newly established base at Phan Rang, just south of Nha Trang and Cam Ranh Bay, and the B-57 operation was moved with them. This relocation took effect on 13 October 1966, and became the last base of operation for Canberras while engaged in the Vietnam war.

Phan Rang was a place of contrast. The airfield was located on the level fertile ground which reached about three miles to the sea, while the building complex nestled at the base of rugged jungle clad mountains that extended to the west. Near the entrance to the base were ruins of a fascinating Cham Temple, reputedly

built in the 12th century, while inside the base was an array of many advanced technologies. To accommodate the expanding war, this air base had been quickly built some eight miles east of Phan Rang, a city of 24,000 inhabitants.

This move initially brought about a strange operating environment for the Canberras. The new hard surface runway had not been completed at the time of this move, so a parallel AM (aluminium matting) runway was laid down beside it from which the jets were to operate. The rolling swells of the uneven surface was of lesser consequence when compared to the hazards of ingesting loose objects and dirt from the temporary surface, into the intakes of the jet engines.

At first, nearly everyone lived in tents until more suitable housing could be completed. Typical quarters became long, one storey wooden structures with the upper portion of the sides left open and screened for air circulation. Eventually a number of mobile homes,

Below: When the engines of the B-57s started, things began to move quickly. Gear pins were pulled and stowed, and chocks were kicked away from the wheels. After the ground crewmen and the pilot had indicated that all was in readiness, the Canberras taxi out for take-off from Phan Rang on another strike against the enemy. *USAF*





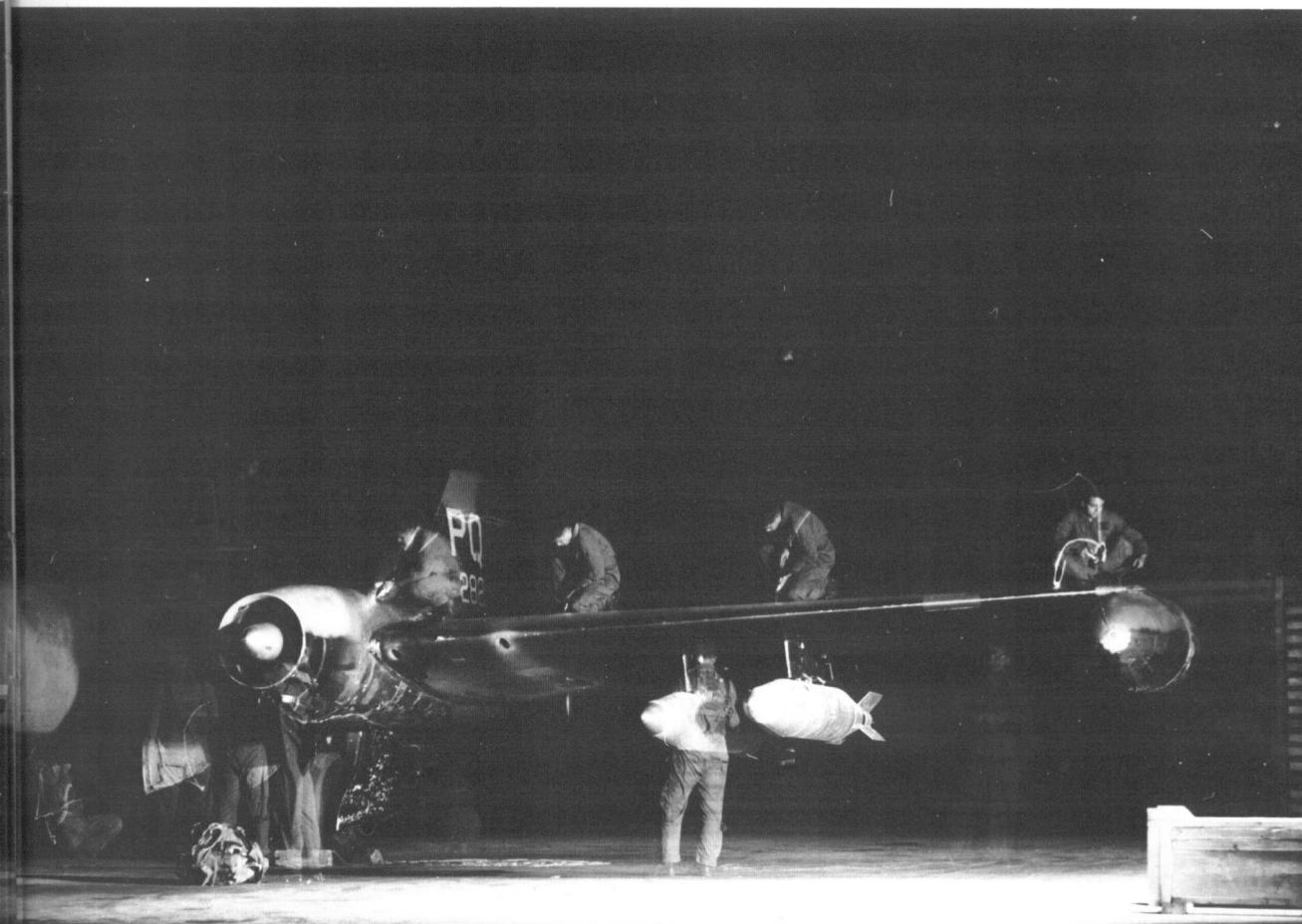
Above: Often the last action in preparing the B-57 for flight is topping off the liquid oxygen system. This can be a dangerous job due to the extreme cold temperature and explosive qualities of the liquid gas. Ed Pearson wears a protective face piece and apron during the 10-minute process. *USAF*

Right: The night scene around B-57s at Phan Rang was often busier than during the day. It was an around the clock job for ground crews to maintain the B-57s for continual attacks against the enemy. Maintenance technicians must share much of the credit for the combat effectiveness of the Canberras. *USAF*

commonly referred to as 'hooches', provided air conditioned comfort for field grade officers and other B-57 crews who often required daytime sleep away from the hot outdoor temperatures. Sounds of the war were always present as protecting South Korean guns would echo across 'Happy Valley' on the west side of the base, and at night flares would light the high ground known to the defenders as 'Old Smokey'. There was little change in combat activity for the Canberras during their stay at Phan Rang. Their daily schedule usually called for 14-18 daytime sorties and 6-8 night sorties for the B-57s. Hazards remained high and four aircraft were lost due to combat during the first 15 months at Phan Rang while the two squadrons continued their 60-day rotational stays.

The year 1967 was a golden year for the two bomb squadrons, for in May and August, the 8th and the 13th Bomb Squadrons respectively passed their 50th birthdays, they had the distinction of being the oldest continually active units in the United States Air Force. On 15 January 1968, however, the 13th Bomb Squadron, known historically as the 'Grim Reapers', was de-activated, and celebrated by flying their 1,000th combat sortie. This left the 8th Bomb Squadron as the only surviving tactical bomb squadron in the USAF. This change called for a permanent move for the 8th to Phan Rang, leaving its ties with the 405th TFW at Clark, and becoming an integral part of the 35th TFW. This deactivation of one squadron did not effect the combat status of the B-57s in Vietnam, since just one squadron strength had been in the combat zone at any one time. It did cause another major shuffling of personnel however. Members having the longest overseas service in the squadron were returned to the US





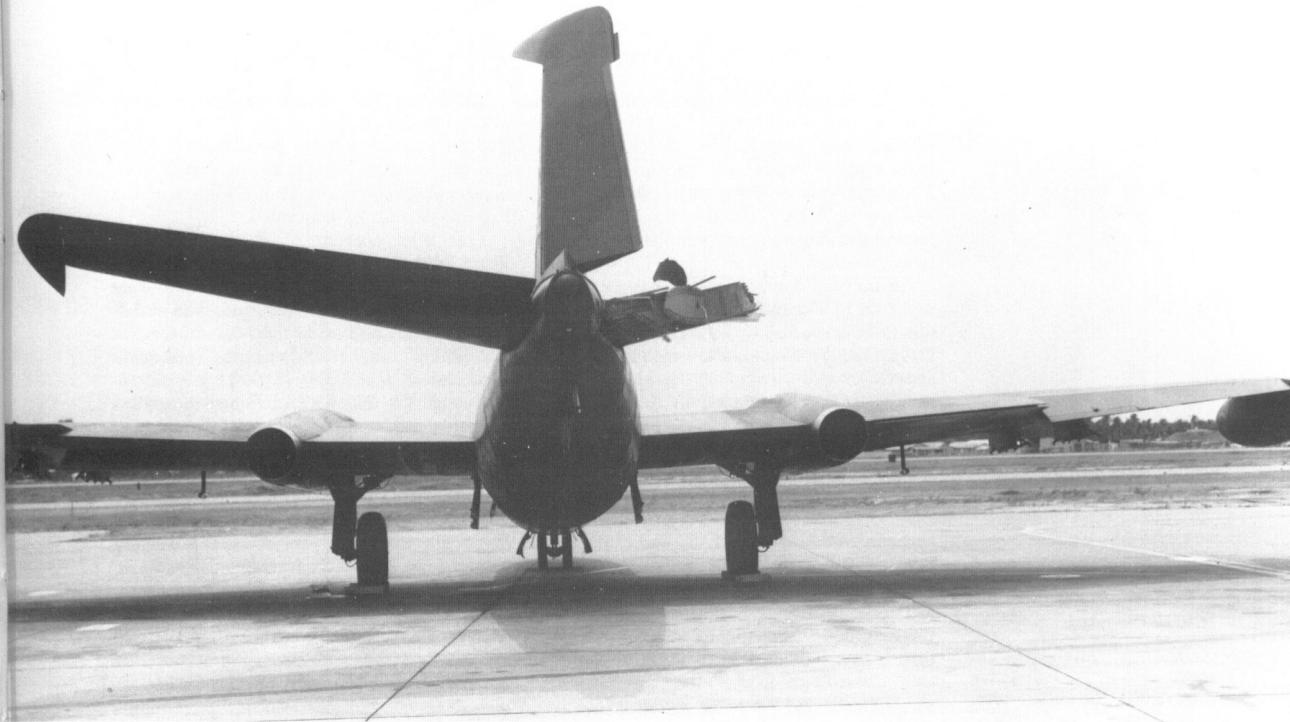


Above: Revetments were constructed soon after the arrival of the B-57s at Phan Rang Air Base. This 13th Bomb Sqn B-57B has 750lb GP bombs on the wing stations. At the request of the aircrews, the light gray undersurfaces were painted flat black for better concealment during night missions./USAF



Left: Nose art was not popular during the Vietnam war, however 'Hell's Angel' adorns the nose of 877 as photographed in January 1968. It may be the only example of such artwork applied to Canberras.

Right: No wonder that Dick Burkholder, pilot (left) and Milton Stein, navigator (right) look happy. They were able to recover safely at Ubon, Thailand, after anti-aircraft fire knocked off most of the right stabiliser and all of the elevator on 282. The damage occurred during a strike in Laos on 4 April 1969./E. Youngs



until the strength reduction to one squadron was achieved. By June 1969 the number of B-57s was reduced to nine Canberras, as 12 had been returned to the US over the previous few months to be converted into B-57Gs. Combat sorties usually consisted of a two-ship daytime strike and 8-10 single ship night sorties. A detachment of four dual control B-57Cs and instructor pilots and navigators remained at Clark to continue training the new crews scheduled to join the squadron at Phan Rang.

Two of the most difficult structural repairs occurred at this time when squadron aircraft strength was at its lowest. As a result of battle damage, a fire started in the aft section of 507, but Maj Orazio and his navigator safely recovered at Da Nang. The fate of the aircraft seemed questionable due to the severe damage, however the aft section was removed from 552 in storage at Davis Monthan AFB, Arizona, and was shipped to Da Nang for the repair. More than once has an engine tailpipe come off a B-57 and caused major damage. This happened to Royce Tate in 551 when taking off on a combat strike at Phan Rang. Before an immediate landing could be made, the wing spar was severely burned, and the right wing had to be changed. Again 552 gave up a major part of herself, but the move of this wing was not as easy as the aft fuselage section had been. Its mammoth 19ft chord dictated that it would only be moved by a

special rail car to the port, then carried by ship to Vietnam 'I was expecting the wing to arrive on a day to day basis,' reported Gene Youngs, who was Martin's Field Representative at Phan Rang for the B-57s 'I saw a truck squeeze through the gate, carrying what I thought was a Vietnamese *house* - not realising until later that this was a crate containing the long awaited spare wing. The container was *huge*!'

An unusual combat loss took place on the night of 13 December 1968 on what started out to be a routine strike over Laos for Majs Dugan and McGoldrick. During their ground attacks in the vicinity of Xieng Khouang, their B-57E, 284 collided in the dark with Candlestick, a C-123 flare-ship with whom they were working, and all crewmembers perished except the C-123 co-pilot.

Before long, the end of operations was in sight for the B-57s that had fought the war for such an extended period. In late September 1969, the Canberras and their crews began leaving Phan Rang and 'Happy Valley' for the last time, recovering at Clark to prepare for the long flight to the United States. Frustrating as it was Dudley Mizer stayed behind to fly the last B-57 out of Vietnam, that being 551 after having its wing replaced. Dudley was the maintenance officer for the 8th, and creating history as pilot of the last American bomber to leave Vietnam was the least of his

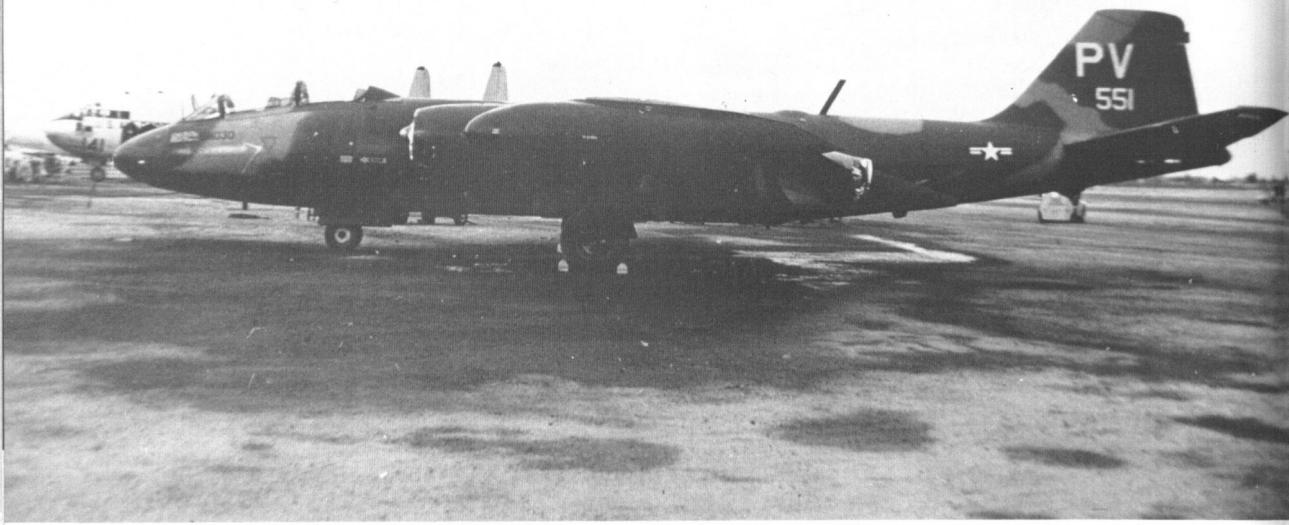
concern when he departed Phan Rang on 15 October.

While this movement of airplanes was taking place, the designation of the 8th was transferred to a unit at Bien Hoa AB, to become the 8th Attack Squadron, equipped with Cessna A-37s, and the long tradition of the 'Liberty Squadron' continued.

This brief account of B-57 activities at Phan Rang is disproportionate for the three long years that many combat strikes were flown from that base. Operations had stabilised however, and aside from losses, the war was being fought without the upheavals experienced in the past. This period did include the Tet Offensive of February 1968, a time that 22 Canberras were often supporting 30 sorties a day to counter these pressing attacks. When the offensive was turned around, the Canberras and their crews continued hitting the enemy and hurting him badly over the entire period, never letting up until the last day they were fragged for combat sorties.

One interesting statistical note here is that, of the 96 B-57s that were assigned to these two bomb squadrons since being deployed to SEA, only one out of three survived the long war. The 32 that did survive were either converted to B-57G to fight again, or were placed in storage, while at this writing, eight are operating with DSES units.

Below: The last jet bomber to leave Vietnam as a result of the Vietnamisation Programme, was 551, which departed in November 1969. It was assigned to the 8th Bomb Squadron, although this earlier picture shows 13th BS markings. *R. Walker*



The FAC's Point of View

'Give me four A-1s (Douglas Skyraiders) or one B-57', was an often quoted request for strike aircraft made by FACs (Forward Air Controller), for the B-57 was the A-1 of the jets for effective pinpoint bombing – and then some.

The foregoing accounts about the B-57s in South-East Asia, retell the experiences of others, plus the notes that I kept while history was being created. For this portion on the FAC's viewpoint about B-57s, I can speak even more authoritatively, for I was an FAC, and I directed strikes for B-57s during 1967/68. To keep in closer touch with my B-57 buddies, I often made stopovers at Phan Rang to hear first hand how the war was going for them. I had been separated from flying Canberras having remained in Japan for another assignment when the two squadrons moved to Clark. As the war continued, my number came up for a FAC assignment before it appeared on the B-57 assignment list – much to my surprise and disappointment.

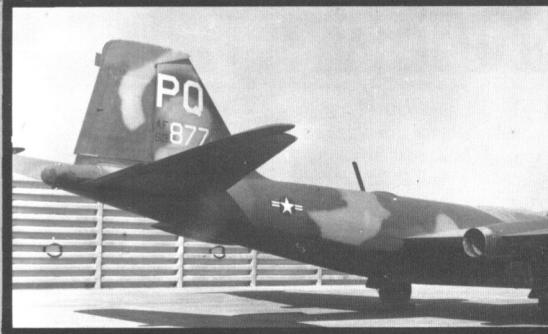
Admittedly, the FAC assignment turned out to be interesting and challenging. Under the rules of engagement used in South-East Asia, ordnance could not be expended in South Vietnam and certain areas of Laos without a FAC to control the strike. Being in a low, slow flying observation plane, it was the FAC's responsibility to locate the target before ordnance was released and ensure that the attack was aimed at the correct target. This all seemed simple enough except for this last requirement when working with the higher performance aircraft. A FAC could readily tell what kind of a day he was going to have by the type of strike aircraft assigned him for preplanned targets. What was hoped for (in alphabetical order) were A-4 Skyhawks, A-37 Tweetybirds or B-57s. As far as jet aircraft were concerned, I found these three types to be the most effective air to ground support aircraft available at that time. The higher performance aircraft needed more room in which to work and several types – which will remain nameless – would hardly come down low enough to the target whereby I could see them when they called 'on target' so that I (the FAC) could respond with 'cleared to drop'.

The B-57s were never a problem. Normally their pattern altitude was a comfortable 7–8,000ft AGL, which kept them always in sight of the FAC that worked near the ground, and he could see all the other members of the flight in the same pattern. When a FAC cleared a Canberra to bomb or strafe, its arrow-like fuselage readily pointed at the target, leaving no doubt in the FACs mind as to what it was lined up with. In a turn, the broad wing would show up well, silhouetted against the sky, which helped to keep track of all the Canberras in the attack pattern.

Working with B-57s at night was still another type of experience. I recall one night while operating in southern Laos, I was having a very difficult time locating road traffic on which to direct three flights of aircraft that were to work with me. I was running

Below: Air strikes in South Vietnam and many areas of Laos had to be controlled by Forward Air Controllers (FAC). Their aircraft were normally the single engine Cessna O-1 Bird Dog, or the twin-engine push-pull Cessna O-2A Skymaster. The latter became operational beginning in 1967 for out-of-country and night missions.





A two letter unit marking system for aircraft carrying SEA camouflage was started in 1967. Seven of these letter codes were assigned to B-57 units and a sample of each is shown here.

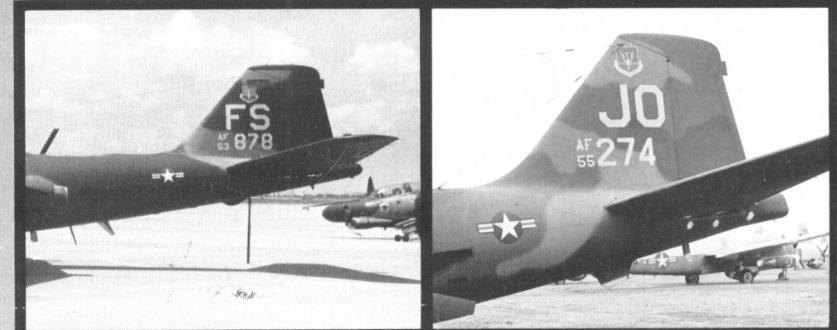
Far left: PQ, 8th Tactical Bombardment Squadron, 405th Tactical Fighter Wing (Clark AB), and later assigned to the 35TFW (Phan Rang). Squadron colour: yellow.

Top left: PV, 13TBS, 405TFW (Clark AB), colour: red.

Below left: FK, 13th Bomb Squadron (Tactical), reactivated and first assigned to 15TFW and carried this code to 8TFW, Ubon, Thailand, when equipped with B-57Gs.

Top right: FS, 4424th Combat Crew Training Squadron, 15TFW, later 1TFW, MacDill AFB, Florida, for training B-57G crews. Black on rudder tip. Below right: GT, 556th Reconnaissance Squadron, 347TFW, Yokota AB, Japan with four EB-57Es.

Squadron later moved to Kadena AB, Okinawa, and B-57s eventually joined the 18TFW.



Below: JM, 4416 Tactical Electronics Warfare Squadron, 363TRW, Shaw AFB, SC, with two EB-57Es. Top of rudder is gray.
Above: JO, 22TRS, later 62TRS, 363TRW, Shaw AFB, lost one B-57E (269) that crashed. Tactical Air Command insignia. Serial number in (below) and (far right) is incorrect. Should be 54274. White letters are 18in x 24in. Numbers are 4½in x 6in and 10in x 15in.





Top: The low, slow flying FAC could more readily spot a target than a crew in a faster moving jet. The FAC in this Cessna O-2A marks the target with smoke rockets then directs the air strike for B-57s or fighter-bombers on to the target in relation to the smoke marker.

Above: A FAC's view of a B-57 as it goes by on a glide bomb run with bomb bay door open and with its 750lb GP bombs clearly visible. Aircraft separation was greater than shown here. The spot at which the Canberra was pointed was easily confirmed by the FAC because of the B-57's long slender fuselage.

a little behind time that night in my relatively slow moving Cessna O-2A, and I hardly had enough time to reach the target area and begin sorting out the few dim lights as being trucks before the first attack aircraft were to arrive. The first to call in was a B-57 crew. I explained my predicament, and they willingly set up a holding pattern to wait until I had something for them. Moments later, a flight of F-4s reported in, already short of fuel, and had to drop quickly. I worked them in on the best target I could locate at the moment. I marked the target with smoke rockets then dropped a flare. The Phantoms made one pass each, dropping everything, and then they were gone.

Relieved that they were safely away, I started checking further up the valley for additional targets, having plenty of time until the third flight was to arrive. Fifteen to 20 minutes could have passed when:

'Covey 43, this is Yellow Bird 48 - do you have any targets for us yet?' I had totally forgotten I had friends waiting, for in the meantime, I had heard nothing from them. B-57 crews seldom pressured the FAC, for they seemed always to have enough fuel to do the job whenever you might be ready for them. Some pilots of other aircraft had to be on the radio to the FAC or others in the flight all the time, but not the case with B-57 crews - (perhaps because they had a back seat member to talk to on intercom!).

Working with a B-57 at night was an experience. Our Cessna O-2A Skymasters carried two flares on the wing and 14 smoke rockets. With a good target such as an active river ford, the attack was started by 'hosing off' two smoke rockets in a dive when aligned as best as possible to where you *believed* you last saw the target. With a sharp pull-up and a climb for altitude to 3,000 or 4,000ft, a wing flare was then dropped to light the target. Informed on timing, the B-57 crew would set up a pattern and were ready to attack as soon as the flare ignited and the FAC called out the target in relation to the two puffs of white phosphorous smoke from the rockets.

The flare did not last long, but by the time it burned out, the Canberra would have started sufficient fires that kept the target well marked. One weapon called the 'Funny Bomb' was spectacular. These were M35s and M36s that were a large canister that opened when dropped. The contents spread as tongues of fire before reaching the ground which seemed to persist for 10-15 minutes and often longer due to sustained fires that they started. Watching from the air it appeared as a blanket of glowing coals being spread uniformly over a large area as they floated to the ground. Anything they touched that would burn - did. Seemingly, only B-57s carried these weapons, yet they were very effective for area coverage.

Many statistics evolved from the air war in South-East Asia, such as the number of bombs dropped per each type of aircraft, loss rates, etc, but there was no scale by which to grade the effectiveness of each aircraft type in attacking ground targets. The FAC was in the best position to observe these results and could compare them with other aircraft doing the same job. Consistently, the B-57 would be named as a top performer. Little was said about this in the news media, however, as focus was always placed on the latest types of equipment being employed. The reason was clear, for the military was desperately in need of new equipment, and to emphasise the effectiveness of the near obsolete type of aircraft was no way to influence the money holders for getting new appropriations. (See Appendix 10 for Combat Comparison figures.)

RAAF Canberras

It would be improper to ignore the Canberras flown by No 2 Squadron of the Royal Australian Air Force, with all that has been said about the American B-57 activities in South-East Asia. Like the B-57 units, it too was stationed at Phan Rang and came under the operational control of the 35th Tactical Fighter Wing as were the American squadrons when on rotation at that base.

The Australian-built Canberra B2os arrived at Phan Rang in April 1967 for a stay, unknown at the time, that would last over four years and extend beyond the time that their American counterparts would be moved back to the United States. This squadron was the third and last operational RAAF unit deployed to South Vietnam, the other two units being equipped with Caribou transports and Iroquois helicopters.

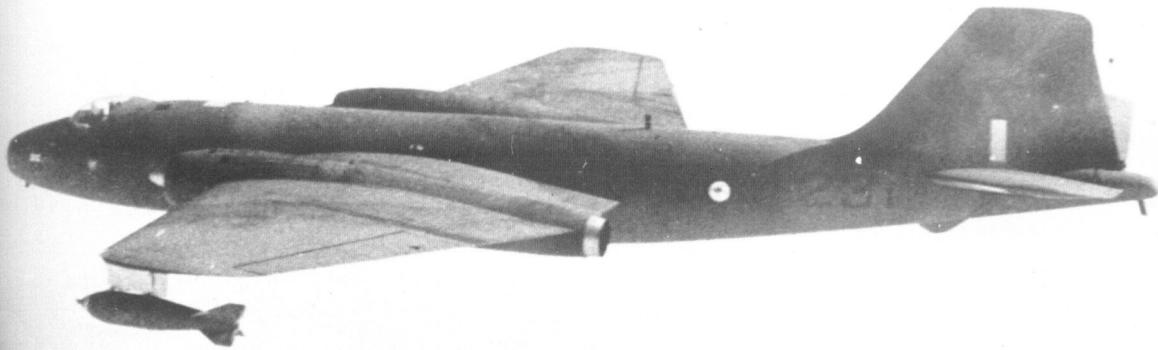
At the beginning of their operational assignment, the squadron of eight Canberras was assigned exclusively to night attack, making drops normally from 20,000ft, directed by ground radar. These operations were known as Combat Sky Spot strikes, which achieved amazing accuracy on fixed targets. They were not intended to replace visual bombing for which the Canberras were configured, but to complement it during poor weather and darkness when visual methods were ruled out.

It was mutually agreed by 7th Air Force and No 2 Squadron, that RAAF bombers would launch eight sorties a day against up to 16 preselected targets, every day of the week. These targets were to be selected by 7th Air Force, and would be anywhere within the four corps areas of South Vietnam. For their radio call sign, the name 'Magpie' was appropriately selected, which symbolised that unit by being a derivative of their squadron insignia.

The first day of operation was 23 April 1967, which called for eight strikes with the aircraft taking off at hourly intervals. They dropped 42 bombs of 500lb each on 11 targets ranging from II Corps in central Vietnam to IV Corps in the Mekong Delta region in the far south. As with all missions of this type where bombing results could not be assessed, the only satisfaction to the crews was that their mission was flown as planned. The Canberras had quickly proven themselves competent in radar-controlled bombing at night, but most RAAF Canberra crewmembers had been trained in visual bombing by day and felt that in this role the Canberra potential was much greater. They therefore supported proposals for having the Canberras put to use in this type of operation.

While USAF squadrons were carrying out day missions under the control of a FAC, the

Below: Preparing to drop its bomb load through low clouds on the enemy, RAAF Canberra B2o of No 2 Squadron is on a 'Combat Sky Spot' mission, where direction and bomb release is calculated by ground radar. This method was frequently used at night by RAAF Canberras and occasionally by USAF B-57s. On the wing tip of A84-231 is a 750lb GP bomb





Above: Resting in the early morning sunlight after ending its bombing mission just before daylight, an RAAF Canberra awaits its ground crew to prepare it for the next night's mission. The B20s were the only level bombers based in Vietnam able to employ a bombardier and a bomb sight.

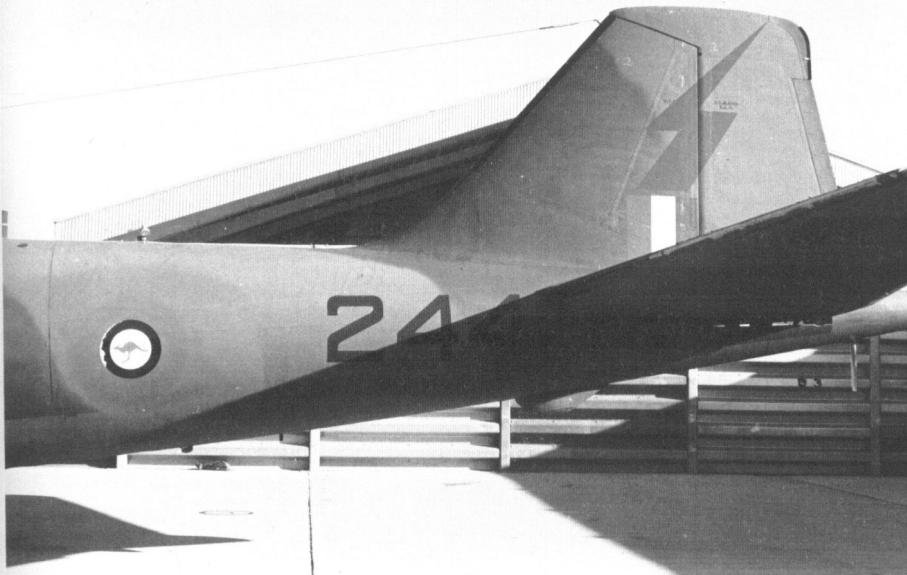
RAAF crews were eager to take part in the same activity. Authorities, though, considered the RAAF Canberras unable to add significantly to the work already being done by the American tactical aircraft since the Canberras were configured for high level bombing. However, as early as 25 June 1967, the Canberras successfully demonstrated that the aircraft was suitable for this type of weapon delivery. Beginning in September 1967, bombing under FAC control began and was immediately successful. Thus, No 2 Squadron became the only squadron in South Vietnam employing a level bombing technique using a precision bombsight of World War II vintage.

Starting from 10 November 1967, up to 50 percent of the squadron's effort was given over to daylight bombing throughout Vietnam under FAC control, which became known as 'Booma' Missions. On 19 November, two Canberras carried out a successful strike during heavy fighting around Dak To in the II Corps area. Dak To, was only a few miles from the Laotian and Cambodian borders and the enemy took advantage of the nearby border sanctuaries to strike with speed and strength. Four North Vietnamese regiments were sent into action. The Allies quickly reinforced Dak To with American and South Vietnamese army units and sent in an array of tactical air strikes together with mass B-52 missions. On that day, Wg Cdr Aronsen and Hughes had been briefed to carry out a radar bombing mission in another area. But this mission had been cancelled and the Canberra crews, reluctant to return to Phan Rang without having dropped their bombs on a target, sought alternatives. Eventually they received a call for an urgent task at Dak To, much further to the north. They agreed to do the job know-

ing they could land at nearby Pleiku AB for refuelling. At Dak To the FAC briefed them to bomb enemy troops who were firing from one side of an 8,000ft ridge on friendly forces on the other side. They were using three heavy mortars and four heavy machine guns. There was little margin for error, but after the FAC had marked the target the Canberras bombed right on his smoke marker. Back at Pleiku where they landed for resourcing, they met the FAC who told them their bombing had been 'magnificent'. He said that after the Canberras had left, the friendly forces, who had been taking severe casualties from the enemy fire, did not hear as much as a 'peep' from the hostile guns and mortars.

By 1969 about 70% of No 2 Squadron's missions were being flown in the Mekong Delta area where the Canberra's characteristics were best suited. The Canberras gave the best results in the delta because of the region's flatness and the fact that the altitude of the target which was almost always just a few feet above sea level could be fed into the bombsight with precision.

Canberras of No 2 Squadron had received battle damage from small arms fire and debris from their own bombs by flying too low during attacks. It was not until 3 November 1970, however, three and a half years after it began bombing in Vietnam, that their first Canberra and crew were lost. This was Magpie 91, assigned to a 'Combat Sky Spot' mission in the Da Nang area. The radar bombing operator reported good radio contact with the aircraft. Plt Off Robert Carver released the bombs from a height of 22,000ft at 20.22hrs following a normal bombing run, after which the Canberra's pilot, Flg Off Michael Herbert, reported that he was turning to a heading of 120deg. This was the last transmission from



Left: Blue tail flashes identify Canberras of No 2 Squadron. Miniaturised national insignia follow the same theme as other camouflaged aircraft operating in SEA

Below: External bomb racks for the B20 was noticeably different and more restrictive than that of the B-57s. Shown here is a 500lb bomb on a wing tip rack, as there were no attachment points for bombs on the main wing section

the crew of two aboard A84-231, and after an extensive search there was never a trace of the missing Canberra.

The second and last RAAF Canberra was lost on 14 March 1971, in the north-west corner of South Vietnam. Fortunately this crew was recovered after one harrowing night's experience, both being separated at this time, listening to the sounds of the jungle where tigers, elephants and many other wild animals and reptiles roamed. Wg Cdr J. Downing, CO of No 2 Squadron and Flt Lt A. Pinches, his navigator, had the dubious honour of being the only RAAF crew shot down by a SAM missile. An immediate result of the loss by surface-to-air missile of the RAAF Canberra was that 7th Air Force directed that no aircraft that was not fitted with SAM detecting equipment would be permitted to operate within the range of known SAM sites. More and more, this lethal enemy equipment was moving into South Vietnam and soon all of the I Corps area (north quarter of South Vietnam) was no place for aircraft to fly without SAM sensing equipment. By this time, the American B-57s had been withdrawn from the war through the Vietnamisation Programme, therefore it came as no surprise when the RAAF squadron was also to be sent home. The 35th TFW was scheduled to leave Vietnam and without their operational and logistical support, their stay at Phan Rang would have meant endless problems. As a result, the squadron flew their 11,963rd and last sortie on 31 May 1971. Long range ferry tanks were then installed and the Australian Canberras left Phan Rang on 4 June for Amberly, via Darwin, to begin a new assignment with their airplanes as a reconnaissance and target towing squadron.



'Patrica Lynn'

There were so many classified programmes connected with the 'Patricia Lynn' Project, that when the name was mentioned, it was often done hesitantly and in a lowered voice. The aircraft for this USAF project were reconnaissance RB-57Es, stationed at Tan Son Nhut. Not only were these the last of the Canberras to leave Vietnam, which was in August 1971, but they were the first jets to be introduced there - May 1963. 'Patricia Lynn', intended as a very short duration project, became the most permanent - lasting over eight continuous years, the longest of any jet aircraft in that conflict.

The need for a more sophisticated means of gathering aerial intelligence became increasingly critical as US Military became more involved in South-East Asia. The US Air Force had developed several new reconnaiss-

sance systems, and where better to service test them than in Vietnam. General Dynamics plant at Fort Worth was awarded the contract to modify two former tow target Canberras to carry this new equipment. Initial modifications included the redesign of the forward nose section to house a KA-1, 36in forward oblique, and a low panoramic KA-56 camera. Mounted on the inside of the specially configured bomb bay door was a KA-1 vertical camera, K-477 split vertical day-night camera, and infra-red scanner, and a KA-1 left oblique camera. So urgent was the need for reconnaissance information, that on arrival at Tan Son Nhut, the ferry crews were now combat crews and were immediately briefed by 2nd Air Division staff for missions needed to be flown. The day after their arrival, Capt Bill Scott as pilot, with navigator Lt Bill Sung, flew the first mission

Below: This 'Patricia Lynn' Canberra survived only two years of the war. Although 243 was the first of six performing this mission, small arms fire during a night reconnaissance mission brought it down in August 1965, but it was able to return its crew to just short of Tan Son Nhut to parachute safely. *USAF*



on 7 May 1963, in 243. Three days later on 10 May, Capt Don Wachholz and Lt Leo Otway completed their first mission in 245. Infra-red photography with good photo interpreters identified such things as VC base camps, small arms factories, storage and training areas that were not otherwise detected by the naked eye. Results of these missions were impressive and the 'Patricia Lynn' Project aircraft were kept busy from that point on.

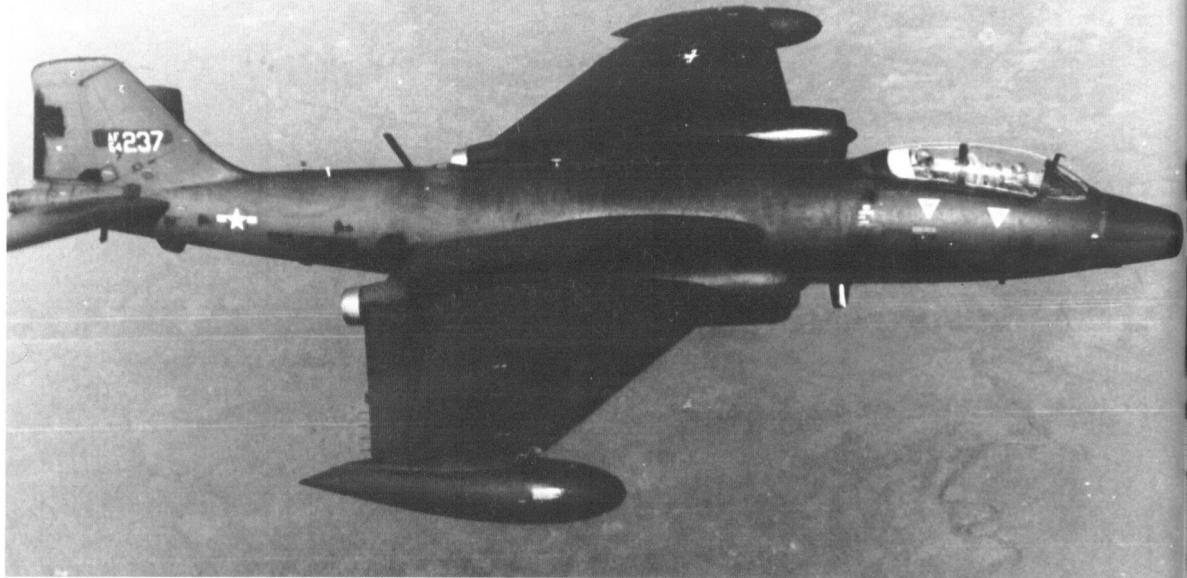
By July 1963, the TDY crews returned to their 6091st Reconnaissance Squadron in Japan and were replaced by permanently assigned crews fresh from the States. The unit became Detachment 1, of the 33rd Tactical Group, and continued to grow, receiving two more similarly equipped RB-57Es, 237 and 249. Several months later, a fifth aircraft arrived, 264, which established the maximum number of five aircraft for this unit. More often referred to as just 'Det 1' throughout their operational period at Tan Son Nhut, in August 1965 their parent unit became the 6250th Combat Support Group. A year later they were finally assigned to the 460th Tactical Reconnaissance Wing. In the air, their radio call sign 'Moonglow' readily identified these Canberras.

Combat situations produce losses, and this unarmed low-flying reconnaissance operation was no exception. The first within a unit is always the most memorable.

While engaged in an in-country night infra-red reconnaissance mission on 6 August 1965, 243 received hits from small arms ground fire. The degree of damage was not known at the moment, but circuit breakers began to jump out in rapid succession. Home base was close at hand and the situation seemed not too critical at that point. Aileron control finally gave out, indicating a possible fire in the bomb bay. Unknown to the crew, fire was seen by others to be streaming along the left side of the fuselage. The pilot, Capt Dick Damon, gave the order to eject and both crew members parachuted to the ground safely. The plane crashed a mile and a half from Tan Son Nhut.

Upon landing in the darkness, navigator Dick Crist came face to face with a Vietnamese. Psychologically prepared to face the enemy at any time, the American grabbed the Asian tightly by the collar and pressed his .38 pistol into his stomach. At that moment, Crist became aware of many others surrounding him as his eyes grew accustomed





to the darkness. It was now apparent that he was among friendly South Vietnamese and he hastily withdrew his weapon. This story was often told among flight crews, and it aptly illustrated that a quick trigger finger could have suddenly caused a friendly group to become – *very unfriendly!*

The second and last RB-57E, 264 was lost on 25 October 1968 after being hit by ground fire in the left engine. Both Capt J. J. Johnson and Maj Phil Walker ejected safely. This aircraft was replaced by 257, equipped with Terrain Following Radar. Unfortunately flight crews did not trust the TFR, so it received little use. There were frequent changes and up-dating of the equipment carried aboard these Canberras, often requiring them to return to the United States for modification. The last modifications made in the late 1960s put 12in focal length KA-82, and 24in focal length KA-83 cameras into the aircraft. These were the first tactical uses of high-acuity, high-resolution photo systems originally designed for spy satellites. The film required special processing but the results were rewarding.

New intelligence gathering equipment test projects carried such names as 'Compass Haste', 'Compass Sight', to name a few. In 1968, 'Compass Eagle' was perhaps the most significant project of them all. Gerry Reponen who was a 'Patricia Lynn' Project pilot at the time, described this equipment as an infra-red scanner and an inflight display screen. There was no need for picture taking and having to identify targets after being developed on the ground. The display screen showed immediately what was happening in the darkness below. This was particularly useful over the rivers south-east of Saigon where the enemy

moved supplies at night in sampans. Gerry flew these sorties they called 'Moonriver Missions', and on the first night they located a fleet of VC sampans. By rearrangement, the Navy was notified by radio of their exact location, enabling them to dispatch PBRs, helicopter gunships or artillery fire into the area. Through this watchful eye, river traffic slowed considerably.

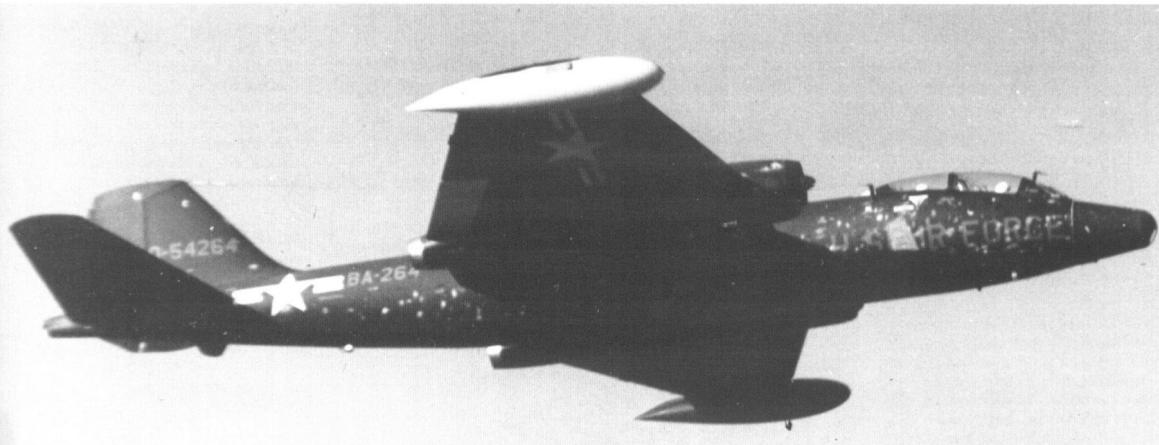
In 1969/70, 'Patricia Lynn' missions were flown regularly in Laos ('Steel Tiger' and 'Barrel Roll'), and also special missions into Cambodia to support the US invasion in 1970. Det 1 received a special citation from MACV in 1970, stating that the RB-57s had provided over 94% of the battlefield intelligence. These few Canberras acquired more daily targets, both day and night, than the two RF-4C and one RF-101 squadrons of the 460th TRW combined. Statistics showed that with four more RB-57Es similarly equipped, the 'Patricia Lynn' aircraft could have accomplished all the day and night in-country reconnaissance during the Vietnam War. This was attributed to the Canberra's stability, manoeuvrability, versatility of equipment, a longer time over the target area, and not to be overlooked – crew ability. Except with 'Compass Eagle' late in the war, crews relied only on visual map reading to locate, identify, and acquire the various types of targets which included night operations. Although these missions were flown at low level, often in darkness in mountainous terrain and too often in marginal weather, they were done without internal radar or outside navigational assistance. When the 'Patricia Lynn' operation was terminated after mid-1971, one (245) or more of the RB-57Es nearly reached the 8,000 flying hour mark.

Above: The presence of 'Patricia Lynn' RB-57Es were acknowledged throughout the Vietnam war, but their actions were seldom openly discussed. Even their black painted exteriors make them look sinister and crews felt that this unusual decor attracted more than their share of enemy fire.
[L. Mongeon]

Above right: Canberras took their punishment on the ground as well as in the air. Hundreds of patches cover holes on 264, inflicted during a mortar and rocket attack on 14 April 1966 at Tan Son Nhut. *[USAF]*

Centre right: En route to Gifu AB, Japan, for further repairs, 264 is seen here on 26 June 1966 departing Itazuke AB after refuelling stop. *[H. Inoue]*

Bottom right: Fully repaired and repainted, 264 is again ready for action. RB-57Es of the 'Patricia Lynn' project established a remarkable record for any type of aircraft. Over this eight year period, two of the six airplanes were lost to combat, and two were with the project from beginning to end. One flew over 8,000 hours and retired to the US to fly in a more peaceful occupation. *[USAF]*



B-57G Night Intruders

During the war in Vietnam, there evolved a major modification to the bomber version of the B-57. Originally conceived as a night intruder, it could do the job no better than the earlier Douglas B-26 which it replaced when called upon to perform night missions in South-East Asia. The B-57G was developed to fill the requirement for a completely self contained night attack system specifically designed to interrupt the flow of enemy supply traffic over the trails of Laos. Thus, 25 years after it was acquired as a night intruder aircraft, the B-57 was equipped to fill its mission properly.

To provide night intruder configured airplanes, modifications were made to existing B-57Bs, which then became B-57Gs, a creation of the project known as 'Tropic Moon III'. The earlier 'Tropic Moon II' programme experimented and combat operated from Phan Rang AB from December 1967 until July 1968, with a low light level television mounted in a pod under the left wing of three B-57Bs, 518, 580, and 860.

By June 1969, 16 Canberras had been withdrawn from Phan Rang and returned to Baltimore, Maryland (see Appendix 6). There, under a joint contract, Martin modified the nose sections of these aircraft, and Westinghouse, the prime contractor, installed newly developed sensing and tracking systems. While these aircraft were in the various stages of completion, the first 'G' model accepted by the Air Force was flown from the factory in July 1969 by Lt-Col Paul R. Pitt, to MacDill AFB, Florida. Pitt was the newly appointed Commander of the 13th Bombardment Squadron, Tactical, that was reactivated on 8 February that year at MacDill. After intensive and accelerated training, the 13th Bomb Squadron deployed to Ubon, Thailand, in September 1970, and became part of the 8th Tactical Fighter Wing with 11 B-57Gs. Follow-on training for replacement crews was handled by the 4424th Combat Crew Training Squadron at MacDill which retained four of the 'Gs' and the four 'Cs'. One B-57G, 905, was lost the previous December in an

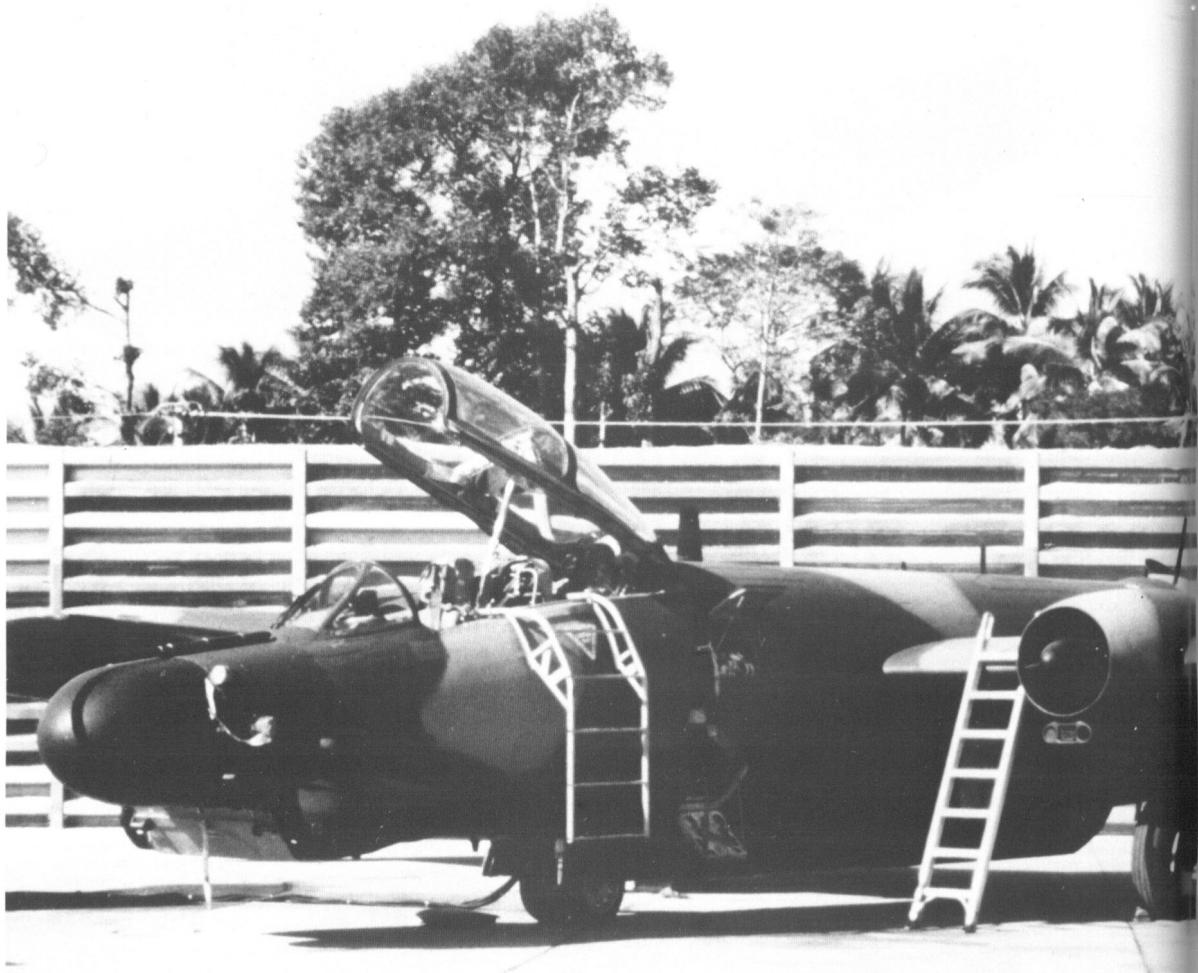
Below: To attempt again to develop a true night intruder bomber, the B-57G model of the Canberra series evolved. Airframes of 16 B-57Bs were withdrawn from combat and extensively modified to incorporate among many things, electronic sensors for night and all weather attacks. Westinghouse and Martin made these modifications.
/R. Hunter





Above: There was no mistaking the B-57G with its enlarged, jowl-like nose section which housed the low light level television system and other sensors for detecting moving ground targets and controlling laser guided bombs. Forward pointing boom contains pitot tube./E. Youngs

Left: Redeployment of the 13th Bomb Squadron to the war in SEA with 11 B-57Gs went without incident. Raising the canopy of his Canberra at Kadena AB en route to Ubon AB, Thailand is Darrell Van Citters with navigator Ron Reppe. Others look on with awe at this strange - yet sinister-looking war machine./P. Pitt





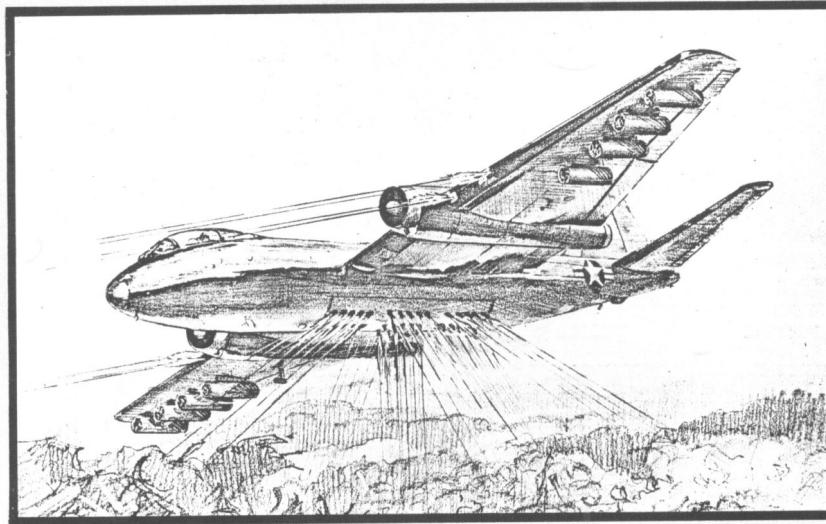
unfortunate fatal accident during the single engine test phase while being flown by Martin test pilot Bob Turner.

The newly equipped airplanes contained three sensors; forward looking radar, infra-red and low light level television plus a lasering device. The systems operator worked the equipment from the rear seat while the information flowed through a computer for automatic bomb drop after receiving consent from a switch located in the front pilot's compartment. The pilot received direction from a heading indicator for target alignment. Bombing runs were flown at 5,000 to 7,000ft above the ground. Once a target was identified, one of four 500lb laser guided Mk 82 'Smart Bombs' carried on the wing stations would be released. To keep the laser on the target continually as the bomb followed its beam, it was necessary to slow the airplane and nose it over into a shallow glide for the longer time of fall since the system was originally planned to be operated at 1,500ft. Four M35 or M36 'Funny Bombs' were carried in the bomb bay for use with the sensored bombing systems. When these were exhausted, M117 750lb bombs became the standard internal ordnance. The former wing guns were removed, for these modified Canberras were exclusively level bombers.

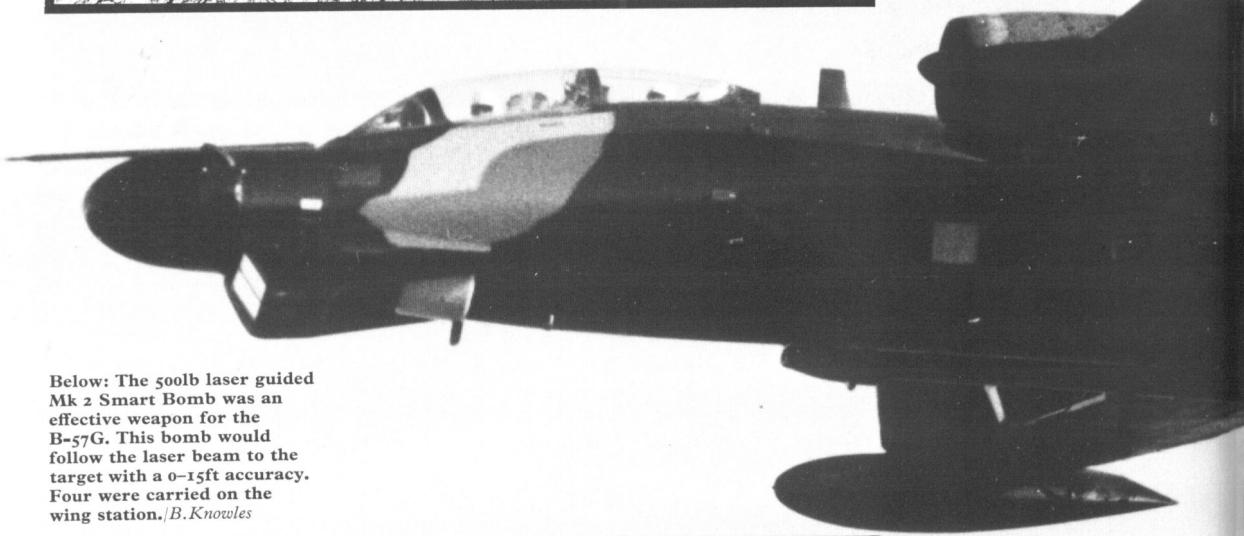
From the early 'Tropic Moon' days that led to the development of the 'G', Paul Pitt had been with the programme and had many good things to say about the airplane. The 'G' had a new instrument landing system for better all weather capability. With the docile

Above: Staying with the Canberra from the very beginning was Gene Youngs, Martin Field Representative. Youngs, known as 'Mr B-57' to those that admired his technical knowledge about the airplane, spent most of his 16 years with the Canberras in the Far East and SEA. Deployed with the B-57G to Thailand, he is shown here checking the Heading Reference System while M/Sgt Humphries assists.

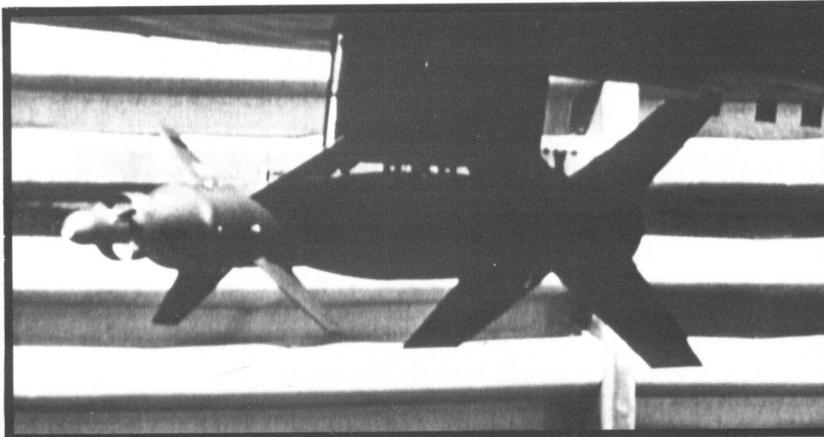
Left: Resting in the hot sun at Ubon AB in December 1970, this B-57G is being readied for another night mission along the Ho Chi Minh Trail in Laos. Modifications to these 16 Canberras cost about \$49 million, an extremely expensive programme which was often criticised. The operation ended after two years of combat./USAF



Left: A number of weapon systems were tried on B-57s. One called for 52 M60C guns at varying downward angles for use as an antipersonnel and suppression weapon. Others were the 'Hayes Dispenser' - a box attached to the inside of the bomb bay door having many tubes containing small bombs. When the door rotated open, the discharge of the respective tubes was controlled by an intervalometer. These and others were tested for the B-57, but none became operational.



Below: The 500lb laser guided Mk 2 Smart Bomb was an effective weapon for the B-57G. This bomb would follow the laser beam to the target with a 0-15ft accuracy. Four were carried on the wing station. /B. Knowles



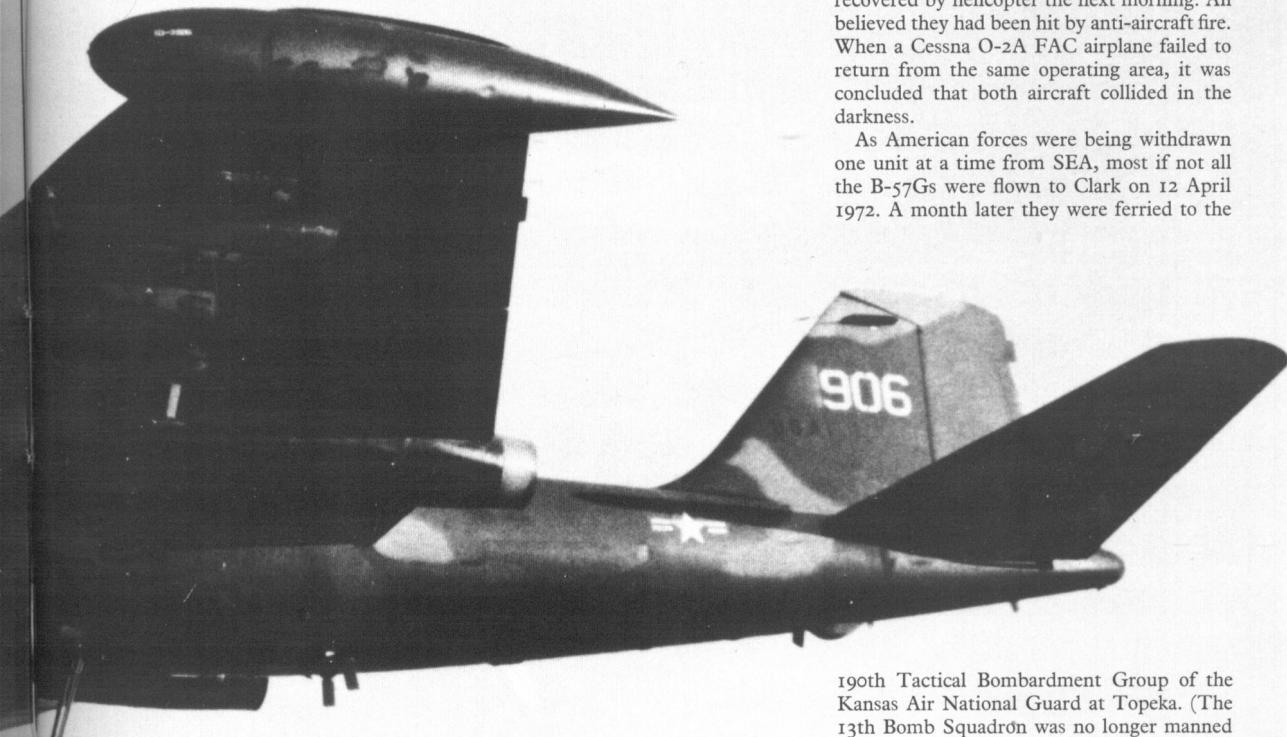
Above: An advanced weapons system called PAVE GAT was installed in B-57G 906 in 1971 for test at Eglin AFB, Florida. This was a gimbal mounted, downward firing M61A1 gun turret which was slaved through the computer of the electro-optical sensor for target tracking. Note gatling gun barrel pointing downward from the bomb bay. Accuracy was good, but project was discontinued. /USAF

flying 'feel' caused by the enlarged nose, the airplane was very stable which made instrument landing quite easy. It was a bear, however, when landing with one engine and it was wise to hold 10kts more than the minimum single engine airspeed of 155kts for the standard B-57. Some said that it was under-powered with the added frontal area, and

during the redesign phase the installation of a more powerful engine was considered. But speed was not essential according to Paul, for this mission was normally flown best at between 250 and 300kts indicated.

The only operational loss of a B-57G occurred on the night of 12 December 1970, deep in southern Laos. The crew of which Paul Pitt was the pilot, safely ejected and were recovered by helicopter the next morning. All believed they had been hit by anti-aircraft fire. When a Cessna O-2A FAC airplane failed to return from the same operating area, it was concluded that both aircraft collided in the darkness.

As American forces were being withdrawn one unit at a time from SEA, most if not all the B-57Gs were flown to Clark on 12 April 1972. A month later they were ferried to the



190th Tactical Bombardment Group of the Kansas Air National Guard at Topeka. (The 13th Bomb Squadron was no longer manned or equipped but the squadron remained on the active list until 30 September 1973.) After two years of service with the ANG, the 'Gs' were retired to the reclamation depot in 1974, and after a time were scrapped.

The modifications of these B-57s as a test programme was an expensive project and proved to be hard to maintain, thus the true worth of the effort may seem questionable. The effectiveness of the well publicised AC-130 with its battery of gatling guns may well have proved a more economical weapon against truck traffic. But according to Bob Hunter, former 13th Bomb Squadron pilot, and later PACAF staff monitor for the night intruder missions in SEA, 80% of the bombs dropped by B-57Gs using laser guided bombs, hit within 15ft of the aiming point. This was constructive evidence that the Air Force had achieved a self-contained, all-weather night interdiction bomber, able to deliver heavier ordnance than guns could provide.

Pakistan Air Force B-57s

How much effect the inactivation of the 345th Tactical Bombardment Group had in equipping the Pakistan Air Force with B-57s is not known. It may well have been the needs of PAF to be equipped with bombers that hastened the closing of the 345th. In either event, in 1959, 25 B-57s from this inactivated Group were ferried to Mauripur Air Base, Karachi, Pakistan, under the Military Defense Assistance Plan (MDAP) and formed the 7th and 8th Bomber Squadrons of the 31st Bomber Wing. (See Appendix 8 for aircraft serials.) A USAF training team was sent to Pakistan for the initial training of PAF air crews.

To meet the agreed September 1959 delivery date, the airplanes were sent without the all-weather bombing systems promised by President Eisenhower during his visit to Karachi. When the RB-1A 'Georgia Peach' Bombing System became available, three or four spare nose sections kept at the Warner-Robins Air Depot in Georgia, were modified with the new equipment. (Two RB-57A, two B-57B and two B-57C/E nose sections forward of the canted pressurised bulkhead were on hand as spares.) This modification required a longer, more pointed shape to their nose. These were transported to Karachi and replaced the standard nose section at the point of separation behind the cockpit. The removed nose sections were returned to the US to likewise be modified and the cycle was repeated until the PAF bomber force had an all-weather capability. Wing racks were modified on some aircraft to carry four F-86 type drop tanks to provide sufficient range for bombing attacks on Calcutta.

With the warlike tensions that prevailed in the Middle East, and the seemingly rapid disbandment of the USAF's tactical bomb groups and wings, it appeared likely that if any American built B-57s were to see combat, they would be in the hands of the Pakistani crews. The inevitable war did erupt between India and Pakistan in September 1965, which involved these B-57s, but this was seven months after the first bombs carried by USAF B-57s were unleashed on an enemy in South-East Asia. The conflicting reports about gains and losses in the 23-day air war by India and Pakistan are so controversial, that these claims

will not be perpetuated here. It is interesting to note however, that the exchange of sorties with bombers were by Canberras from both sides; Martin B-57s from the PAF, and English Electric Canberras of several models with the IAF.

With the outbreak of war, all US aid to the PAF was abruptly terminated. Replacement parts not already in stock were either locally manufactured or old ones repaired to keep the B-57s in a readiness condition. By 1967 the greatest impact on the B-57s was the shortage of replacement J65 engines. In September 1970, as an effort to balance power again in the troubled Middle East, the Pakistani Government was offered an option to purchase as a 'one-time exception' a limited amount of US military equipment. This offer included seven additional B-57s, but this was declined. The balancing effect was short lasting, for in December 1971, the '14-Day War' erupted, which brought the PAF B-57s into open attacks against Indian airfields and military installations. Again the results were conflicting, but in both Indo-Pakistani wars, the losses of aircraft were significant, reducing the number of Canberras on both sides. As of May 1970, No 8 Squadron as well as No 31 Wing were de-activated. All aircraft were then allotted to No 7 Squadron, of which the most recent reports show 11 B-57s assigned.

Below: This flight of two B-57Bs exchanged blow for blow against the Indian Air Force's British made Canberras in the India/Pakistan War with air operations that began in September 1965.

Modifications followed which elongated the nose for an all-weather bombing system. Insignia is medium green and white./R. Walker

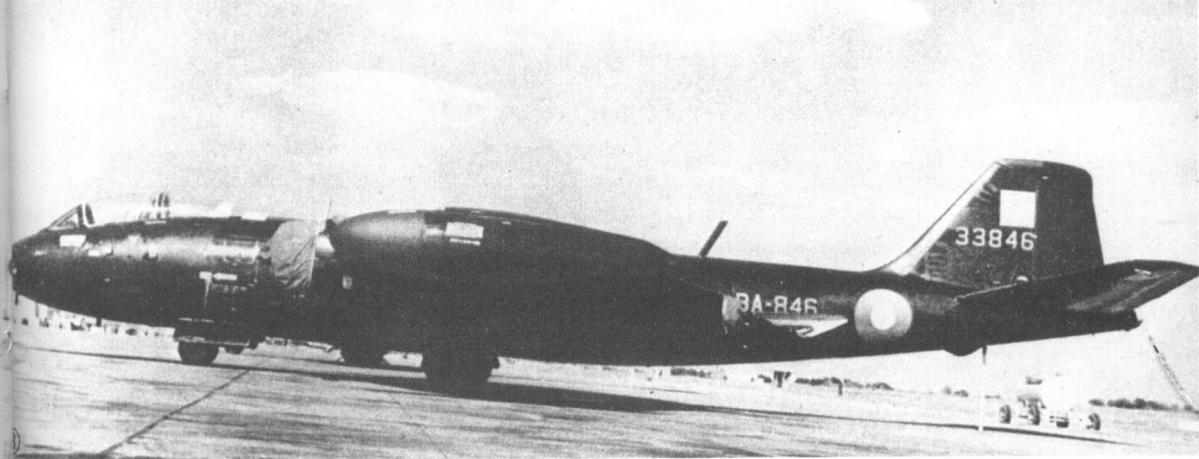
Right: The counter bomber force to the Pakistan Air Force's B-57s were Indian Air Force Canberras, mostly of the Mk 8 variety shown here. Canberras began filling IAF ranks in early 1959 which prompted the PAF to be similarly equipped.

Below right: When the 345th Bomb Group was inactivated, 25 of its B-57s were transferred to the Pakistan Air Force under the US Military Assistance Program in late 1959. This Canberra was one of three B-57Cs assigned with this group of airplanes. Triangular shape on side of fuselage is the cavity from which the speed boards are extended.





E



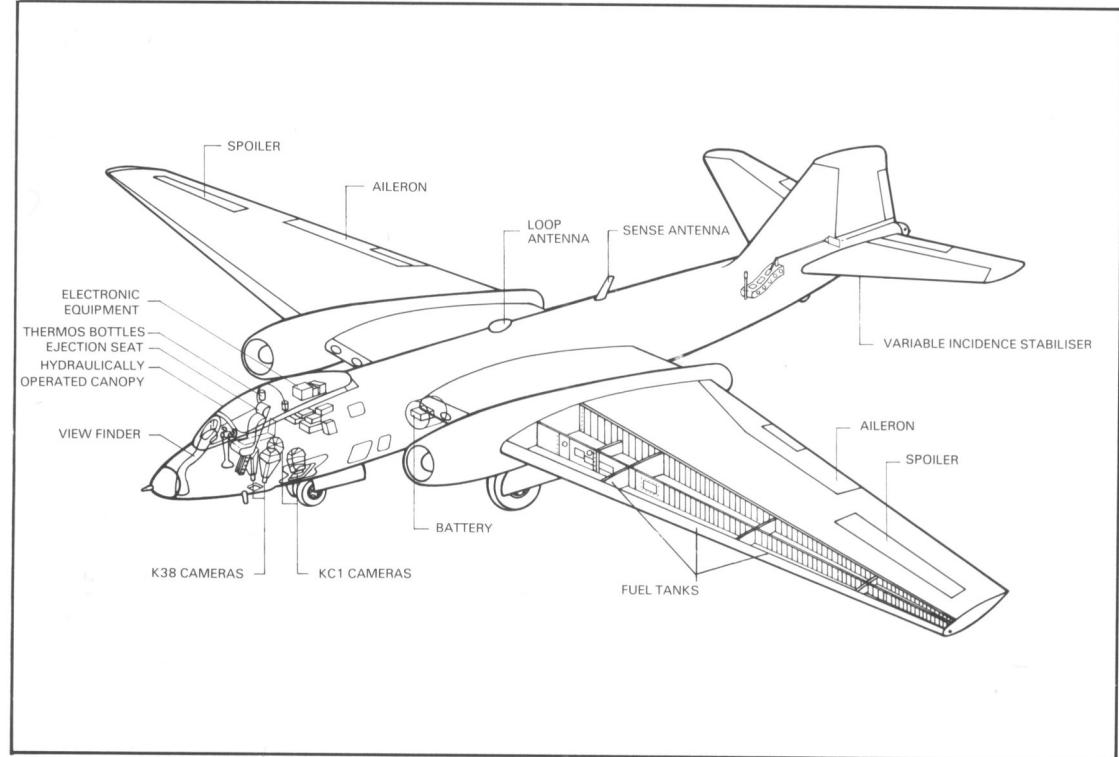
The Long Wing RB-57D





Below: Daylight high altitude reconnaissance, a mission not envisioned for the original Canberra, was also added to the B-57's versatile repertoire of assignments. This publicity picture of an RB-57D in the foreground shows the vast wing design change required in transforming the basic RB-57A flying behind it. Note the covered canopy indicating that this is a single seat type. Twenty were completed, of which six carried two man crews. An overpowered glider, the RB-57D was unarmed and in the rarified atmosphere above 50,000ft it could not be intercepted by the MiG-15 type of fighter.

/Martin



Above: Martin RB-57D 'Zero' Canberra (Groups A and B).

Top right: Martin RB-57D-1 (Group D).

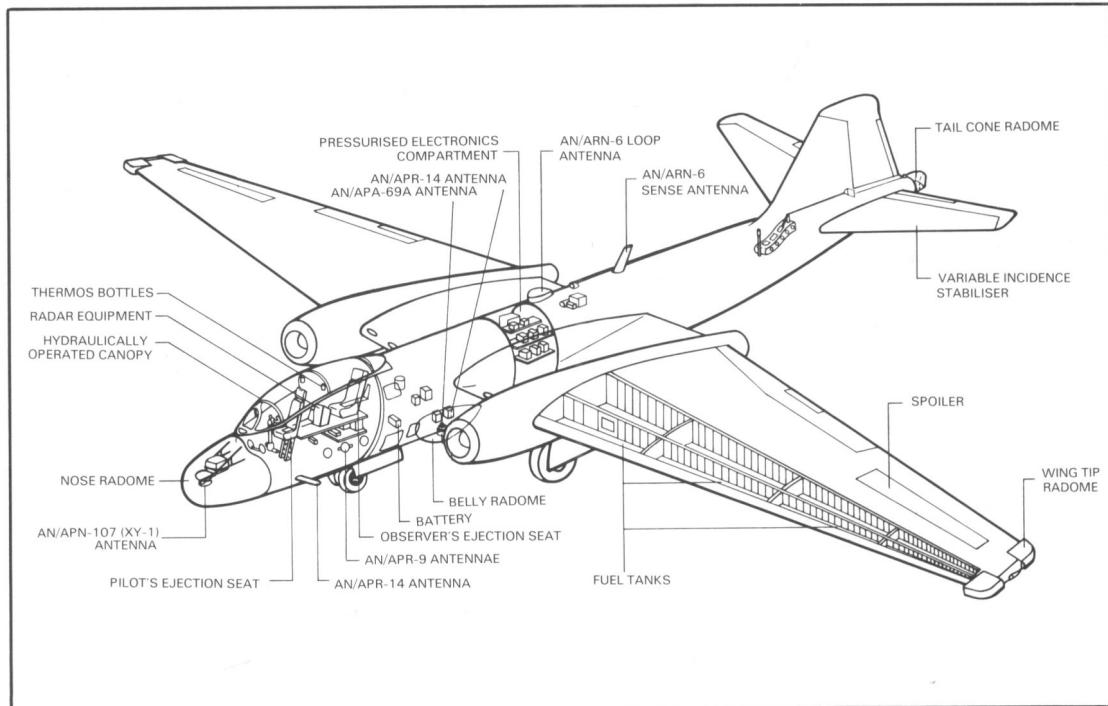
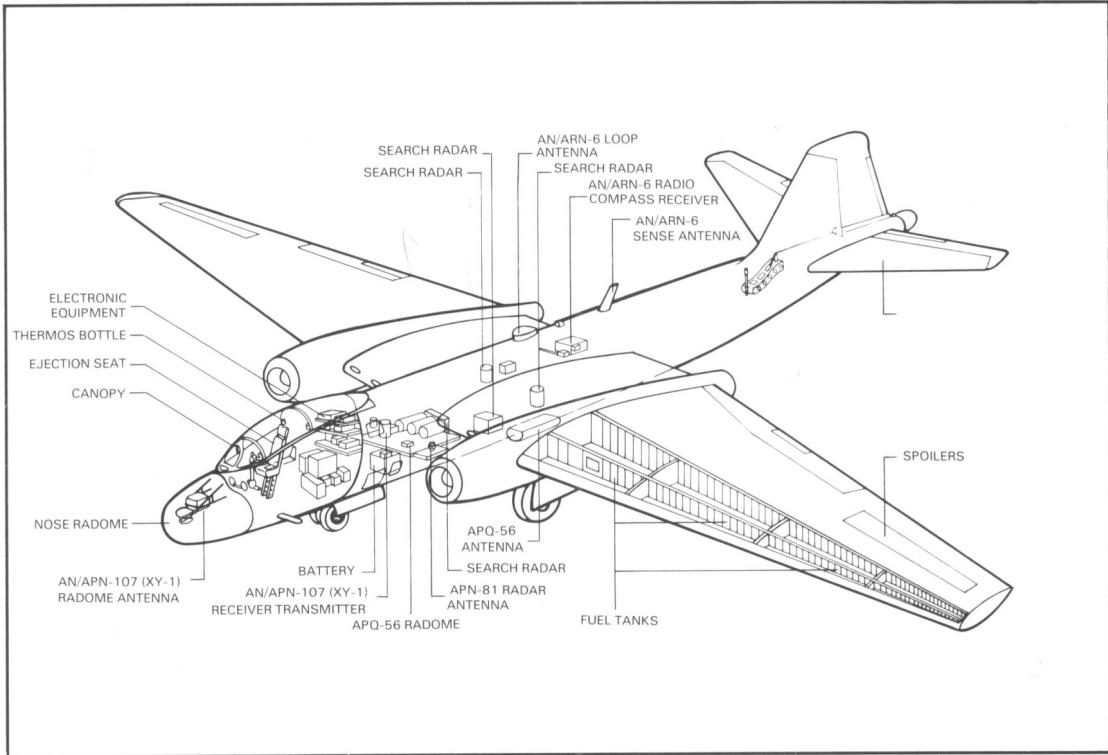
Bottom right: Martin RB-57D-2 Canberra (Group C).

When 'Teddy' Petter first designed the stubby-winged Canberra, he could never have envisioned to what extremes these wings would be stretched by American designers. While the B-57 tactical bombers were beginning to take shape on the production line, word leaked out that a B-57D swept wing strategic bomber was in the making for the Strategic Air Command. There did evolve a B-57D for SAC, but it was a reconnaissance airplane sporting a straight wing, stretching 106ft, nearly twice the standard model's 64ft span.

Of the 20 RB-57Ds built, there were four distinct model Groups (see Appendix 4). Differences were slight, but seemingly all were designed for specific parts of the world for a given mission. In addition to the oversized wing, enlarged nacelles housed 10,000lb thrust J57 engines. Bomb bays were skinned over to reduce the weight of the standard bomb bay door. Wing spoilers augmented a stubby aileron, and wing flaps and speed boards were eliminated as a further weight saving measure. Despite its large wing and bigger engines, its empty weight was comparable to that of the B-57B. Honeycomb sections formed the wing in which all the fuel was carried in the wet wing and leading edge tanks. The often waxed skin was literally

glued to the structure and its greatest hazard was de-icing fluid which might loosen the glue, and damage caused by the dropping of mechanic's pliers and screw drivers on the thin .010 skin surface.

While I was at the Martin Plant to take deliveries of B-57Bs, I had the feeling I should pretend that these strange looking Canberras on the ramp did not exist. Any comments made about the long, drooping winged birds was done in hushed tone. This was April 1956 and deliveries were being made to the newly formed 4028th Strategic Reconnaissance Squadron at Turner AFB, Georgia. At the receiving end was Stan Bunicky, a recent graduate of the B-57 transition school at Randolph, but these 'Ds' were not like any of the Canberras he had flown. However, it became his task to train the newly assigned pilots as they joined the unit. By the time the squadron was operational and moved to Laughlin AFB, Del Rio, Texas, six of the airplanes were deployed to Yokota AB, Japan, in the early fall of 1956. These were of the Group A airplanes of the photo reconnaissance versions with only a pilot, and without in-flight refuelling. These SAC airplanes, code-named 'Black Night', supplemented the Yokota based 6021st RB-57As having higher thrust J65 'Heart Throb'



engines for their strategic reconnaissance mission in the sensitive areas of the Far East.

On the other side of the world, four of the Group B aircraft with in-flight refuelling capability, made occasional visits to Rhine Main, Germany. Their missions were long and for this reason the airplanes were equipped with an autopilot, and rudder pedals that could fold, giving the pilot room to stretch his legs. Two more 'long wings' joined the unit, one being the only RB-57D-1, 963, featuring a large nose radome and lengthy sausage-like radomes faired into the centre of the fuselage under the wing roots. Its special high resolution side-looking radar capability was obviously designed exclusively to penetrate the Iron Curtain. By 1959 these airplanes were permanently assigned to Rhine Main as part of Project Big Safari, forming the 7407th Support Squadron, and assigned directly to USAFE Operations. All RB-57D operations were closely guarded, and they received only a trace of publicity in their early operations. They too were termed the 'Spy in the Sky' along with the U-2.

The Yokota based RB-57Ds left the scene in late 1957, only to have about three of them reappear in late 1958 on Taiwan, at Taoyuan AB, near Taipei. Carrying Chinese markings, they made frequent reconnaissance flights over the mainland during this period of the Taiwan Straits Crisis. At least one was shot down when making a premature descent back to Taiwan, while two are known to have returned to the US when the programme ended around 1963. At the onset, Ellis Bruch and Bill Bunting of the 3rd BW took two B-57Cs from Japan to Taiwan and trained two Chinese pilots to fly the Canberra. This checkout programme code-named 'Diamond Lil' ended abruptly at just under 30 days when the two sides began air engagements. According to Bruch, the pilots were top-notch and may well have managed their own training for the 'D' from that point on.

The long wing model began to lose favour when wing failures occurred and SAC placed several in storage by early 1959. Two outer wing panels literally broke off after landings at Del Rio and Kirtland. Their 500-hour mark for the designed airframe life was being surpassed by some, but a few were retained to continue with the mission out of Rhine Main until 1964. In the meantime, the Air Defense Command saw the potential of this high altitude airplane as a 'target' for the increasing capabilities of fighter-interceptors. Modifications were made to strengthen the wings of the grounded 'Ds', and Electronic Counter-Measures equipment was installed. The 4677th Defense Systems Evaluation Squadron of ADC at Hill AFB, Utah, received 12 of the RB-57Ds over a period of



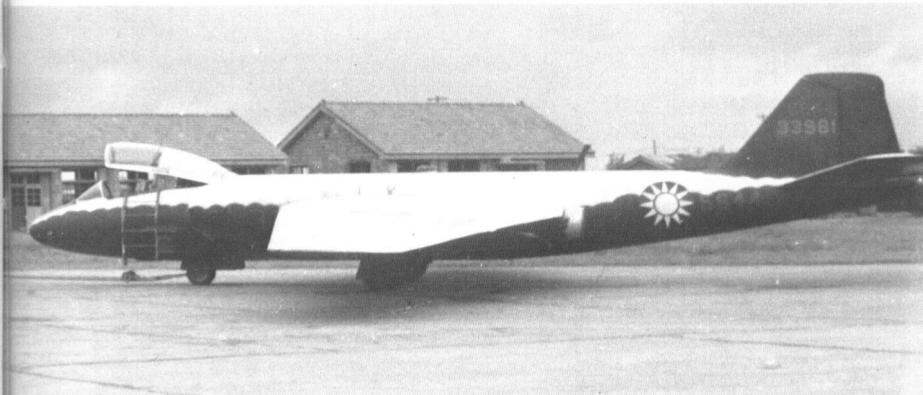
Left: Black smoke trails from the RB-57D's twin J57 engines as it forms a spectacular climb curve after take-off. In about 15 minutes the 'D' could reach 50,000ft. Take-off roll was less than 2,000ft, leaving the runway at 106kts. Best initial climb angle was about 25 deg. *J. Andrews*



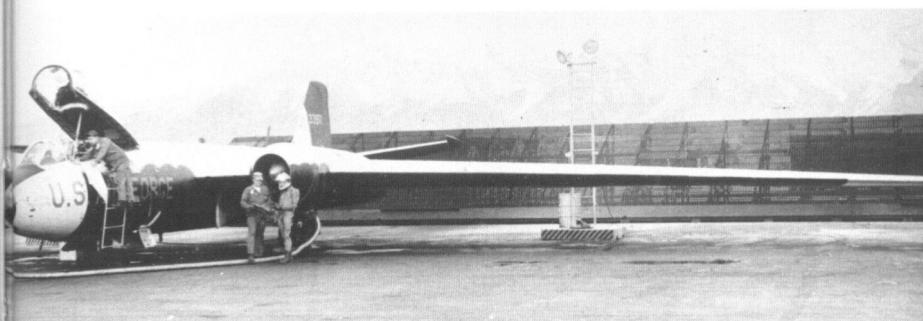
Below: Pressure suits required for all high altitude flights in the RB-57Ds were always a task to get into. Capt Homer Caldwell of the 4677th DSES in 1962, gets into a capstan partial pressure suit variety that was later replaced by CFU-4P experimental suits. All were commonly called 'Get-me-downs' which related to anxiety of crews to land and get out of their discomfort. *J. Bruch*

Right: The main drawback of the RB-57D was wing failure like this one of two that literally broke off after landing. A third occurred at altitude, grounding the fleet a second time. Some were structurally beefed-up and remained in service until 1970. *D. Anderton*





Left: After an absence in the Far East of about one year following assignment in Japan, three 'Group A' RB-57Ds took up station on Taiwan in 1959 prompted by the Taiwan Straits Crisis. This time they were clad in Nationalist Chinese markings and operated at Taoyuan AB, Taiwan, carrying out high-altitude reconnaissance flights over the mainland. The author took this picture of 981 when taxiing by in another B-57 on this heavily guarded base.



Left: The long wing span is emphasised in this picture of a 4677th DSES 'target' RB-57D. Hose to port engine extends from ground-power unit used for air starting the J57 engine. In pressure suit in front of engine is Jim Scanlon preparing to depart from Hill AFB, Utah. *J. Scanlon*



Bottom left: On Christmas Island in the Pacific, B-57s gather in 1962 for the nuclear detonation test called Project Dominic. Six black RB-57Ds were used for reaching very high altitudes for cloud sampling in the vicinity of the test area. White B-57Bs tested the radiation effect of the blast as if they were in the escape location after delivering such a bomb. *J.W. Boyne*

time which joined the 30 standard wing models of that unit. These aircraft filled the 'target' training mission well, and also mixed in a small amount of high altitude photography. Another use found for the RB-57D was that of cloud sampling in the vicinity of nuclear bomb tests. In 1958 for Operation Hardtack, several SAC assigned 'D-zeros' (Group A and B models) from Del Rio, were used for the Eniwetok Atoll bomb drop tests in the Pacific. (As early as 1954, RB-57As were used for Operation Castle in Nevada for this sampling, followed in 1956 by Operation Redwing at Eniwetok using B-57Bs.) All models of the B-57 proved very useful for this type of work, and the feature liked most about the 'D' was its ability to carry a good-sized payload of sampling sensors higher than any other current aircraft.

After a three-year period during which nuclear testing had been discontinued, plans for tests resumed. This detonation test called Project Dominic, took place in 1962 and, unknown at the time, was the last above ground nuclear shot by the US. The 4677th DSES at Hill AFB provided five 'Ds' along with crews. These were joined by the one 'D' from Wright-

Patterson AFB (973) assigned there for flight test projects. Six of the standard wing B-57s were also at Christmas Island for this mission. The 1211th Test Squadron (Sampling), Air Weather Service, had operational control over the loaned aircraft and in time acquired permanently assigned WB-57s for the sampling programme. This Kirtland AFB, NM based unit eventually became the 58th Weather Reconnaissance Squadron.

Structural problems in 1963 put most of the 'Ds' back in storage for a second time when all were grounded after 973 lost its wing at 50,000ft. Years passed, and ADC still had a requirement for a high altitude 'target' aircraft, seemingly only to be satisfied by the 'Ds' performance. Martin agreed to modify the wings of the 'D' and guaranteed an additional 3,000 flying hours. Only the 'D-zero's' and D-2s could be made airworthy for the flight to Martin for modification. When completed, it was the third time these airplanes were brought into operational service. Updating of their ECM (Electronic Counter-Measures) gear brought about a redesignation to EB-57D. This 'long wing' model served other test and evaluation missions throughout

Below: The Air Defense Command obtained a number of RB-57Ds and converted them to EB-57Ds as intercept targets for fighter training purposes. This EB-57D-2 now stripped of intelligence gathering radar, retained its radome nose configuration.



the Air Force, but by mid-1970, the last were again placed in storage and in time all were scrapped except for 982 which is now at the Tucson Air Museum, Arizona.

Piloting the RB-57D was a unique experience in itself when compared with other aircraft. Only half power was used for take-off due to the excessive thrust of the larger engines. Should one engine fail at low airspeed and at full power, corrective reduction in power of the other engine could not be done quickly enough to maintain control of the aircraft. After a ground roll of less than 2,000ft, lift-off at 110kts resembled that of a sailplane, then transitioning to a high nose attitude, it was out of sight in a matter of moments. Everything stopped on the field to watch these spectacular take-offs. Initial climb would go to 57,000ft as the optimum altitude for level off. For the best range, cruise-climb would continue until maximum altitude of about 65,000ft would be reached. This capability was slightly less than that of the lighter U-2. Despite the much larger engines on the 'D', fuel consumption at these heights was very low. Climbing in this manner to these altitudes, approximately seven hours of

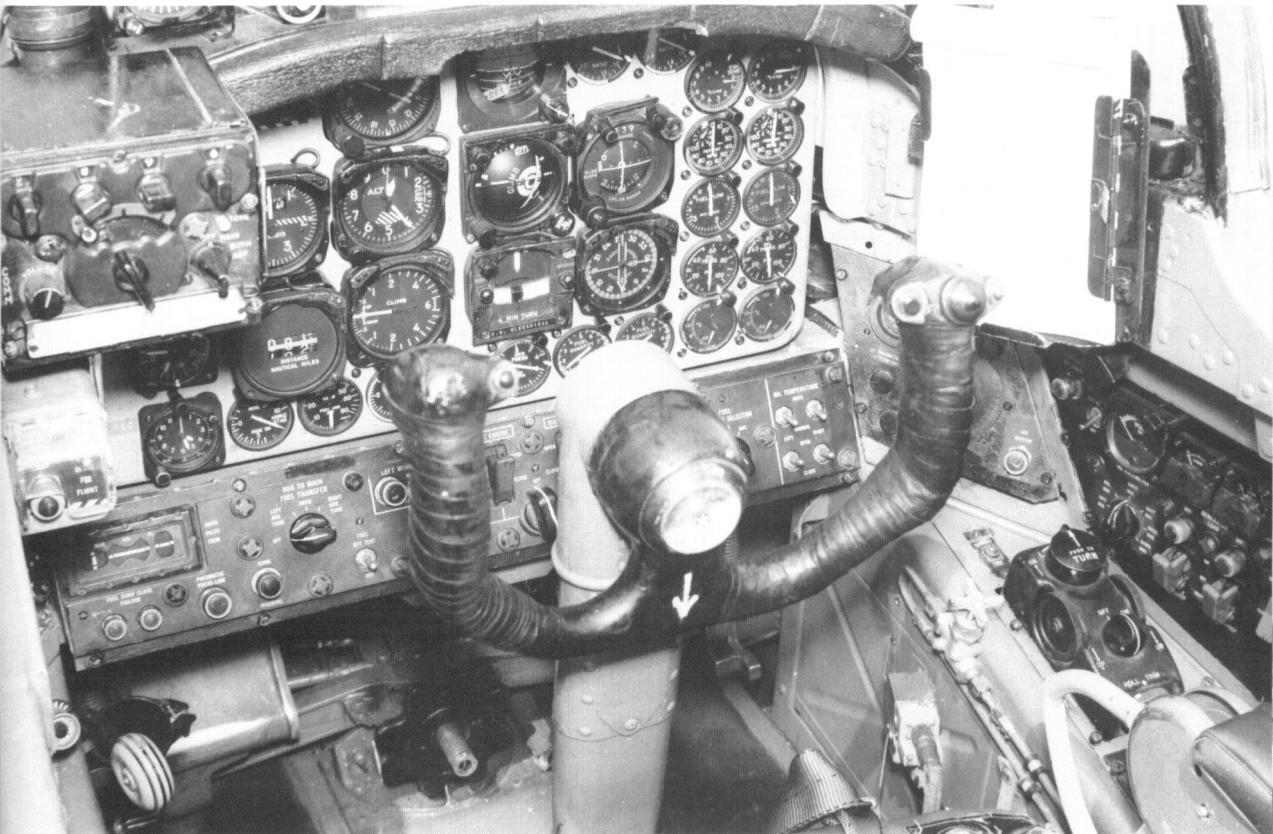
flying could be obtained with the total fuel capacity of about 214 US gallons less than that of the standard B-57B that could fly for about 4.5 hours.

The airplane had a maximum indicated airspeed limitation of 190kts that was further reduced to 180kts IAS when the outer wing auxiliary wing tanks became empty. Although this reduced airspeed seems exceptionally low, it worked out at 420kts TAS plus at its operating altitude.

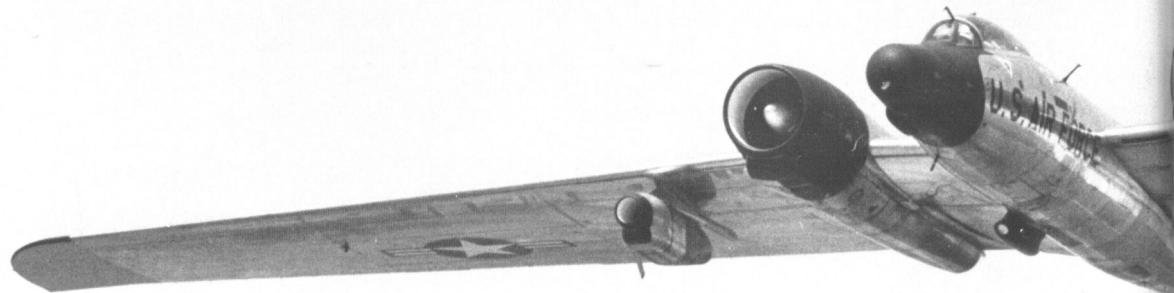
Landing the airplane was quite different from any other because of its low sink rate. Idle power at traffic pattern altitude was still 60%, far more than actually needed. Even with spoilers out and gear down (there were no speed brakes or landing flaps), to dive the airplane on the glide path did little more than increase the airspeed. By raising the nose to produce a slight stall was the best method to hold the airspeed down and to let the airplane settle back to the glide path.

According to Jim Scanlon who flew the 'D' and other models of the B-57s for many years, 'If ever an airplane needed an anchor and a long string to get it down on the runway, the EB-57D was that airplane.'

Below: Cockpit of this EB-57D-2, 968, is very similar to the standard wing models. On the right console are the auto pilot controls not found in earlier models. Control wheel had a comfortable, sturdy look and feel on all models.



General Dynamics 'F'



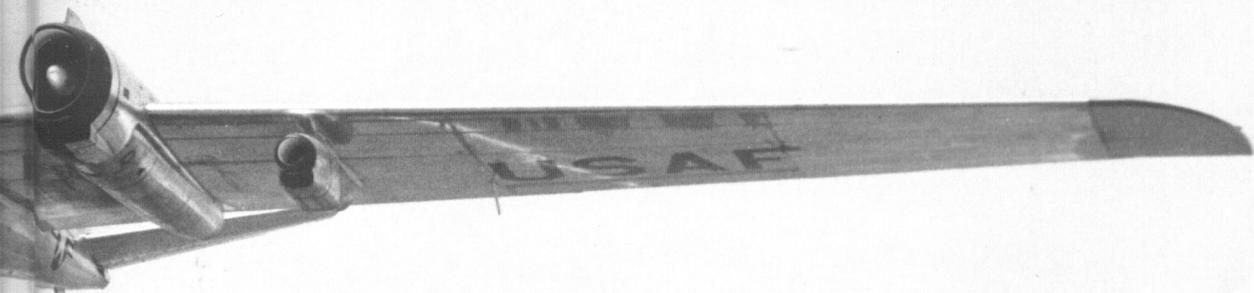
As the service life of the RB-57D was running out, so would end a vital intelligence gathering mission flown by the 7407th Support Squadron at Rhine Main. The arduous task of maintaining these Canberras for the Air Force was the responsibility of the Fort Worth Division of General Dynamics. Making frequent repairs and updating the 'Ds' internal equipment gave General Dynamics considerable experience with the ailing airplanes and they devised a number of ways in which improvements could be made for continuing the mission.

It was not until several new requirements for a 'super D' came about that the Air Force really became interested in the GD/FW proposals. In the early 1960s world wide attention was being focused on the Middle East, and US aid was directed toward Pakistan. From this generated Project Peewee, a highly classified reconnaissance gathering mission calling for a high altitude reconnaissance airplane. In

addition, nuclear tests were still being conducted, and Joint Task Force 8, an agency responsible for nuclear testing and gathering of results, also had a requirement for a high altitude aircraft.

On 27 March 1962, the Air Force awarded a study contract to GD/FW for the RB-57F concept. The object of the study was to obtain, from the basic RB-57D, improvements in performance, maintainability, and an increase in service life. What evolved was a design having even greater wing span than the already exaggerated 'D', reaching 122ft and a wing area of 2,000sq ft as compared to 960sq ft on the standard model. Satisfied with the design feasibility, the Air Force awarded a contract for building two RB-57Fs to GD/FW on 2 October 1962. First metal was cut on 28 November, and seven months later on 23 June 1963, Capt E. 'Ted' Sturmthal made the first flight of an EB-57F. This was the first time that an Air Force pilot made a first flight in a new airplane. Ted was with the programme from the very beginning and re-





mained throughout the development test phase. By February 1964, the 'F' was pronounced operational and two were quickly sent to Pakistan, and shortly afterwards were said to have been operated for or by the CIA.

Production of more RB-57Fs followed. Helping to finance the project was the Atomic Energy Commission since the airplanes would be used for future atomic cloud sampling. (Oddly, this requirement never materialised.) In all, 21 were built, utilising only the original fuselage, horizontal stabiliser, and landing gear from the scarce supply of remaining B-57s. All 14 B-57Bs selected for conversion were from the active fleet, while four RB-57Ds; two formerly with the 7407th SS, were taken from storage at Davis-Monthan AFB. Three RB-57A aircraft were converted to 'Fs' utilising three spare B-57B nose sections (described in the chapter on Pakistan B-57s). Production was completed in March 1967. (See Appendix 5 for airframes converted.) Power for the 'F' was more than doubled by the Pratt and Whitney TF33-P-11A turbofan

engine, furnishing 16,000lb of thrust each. Take-off power was limited to 68% RPM. This gave safe single engine airspeed of 120kts for that power setting with still a relatively short ground roll. The 'F' actually became a four-engine aeroplane with the addition of two detachable Pratt and Whitney J60-P-9 turbojets. These produced about 3,000lb st at sea level and were under each wing outboard of the main engines. The J60s were normally in place, but they were removed for maximum range missions. Not having starters, they were air-started after take-off (except for maintenance functions) after windmilling to 12%. They remained at idle until 32,000ft where throttle control started becoming effective. Full throttle control was available above 42,000ft. They added approximately 2,500ft more altitude, which was comparable to the U-2 of that era.

In the design of the 'F' model, GD not only made use of their 'D' experience, but also the knowledge acquired while building the B-58 Hustler's wing. This same light-

Above: From this angle, the RB-57F, later redesignated WB-57F, looks to be only wing and engines - which proportionately it was. Engines are P&W TF33 turbofans furnishing 16,000lb st each. /L Mongeon



Above: General Dynamics-built RB-57F was the ultimate in expanding the design of the basic Canberra airframe. With new wings that span 122ft, it more than doubled the original wing area. This was actually a four-engine airplane having two detachable pod mounted J60 engines under the wing. Wing tips are formed from fiberglass. The Air Weather Service used these airplanes for high altitude air sampling as well as photography and other high altitude research projects.
NASA

Right: The long wing of the WB-57F often overshadows the many other details shown in this close-up view. Nose was lengthened 40in to house radar, cameras and air sampling equipment. Canopy curtains protect crew from sun radiation in rarified air. This WB-57F, 294 was formerly 935, a 'B' model assigned to the 8th Bomb Squadron, Japan. /N. Taylor



weight honeycomb sandwich skin was incorporated into the 'F', using the earlier tools, fabrication and assembly techniques, giving a saving in production costs. Instead of relying on the one piece wing spars as Martin had with the 'D' in expanding the original wing, the new wing for the 'F' consisted of a three spar design further strengthened with the honeycomb skin structure. The replacement fin and rudder which nearly doubled the original surface area, were constructed with this same technique. In addition to improving single engine control, this increase was primarily to dampen the dutch roll cycle at altitude caused by increased wing area which had been objectionable in the RB-57D.

Airframes that followed the first two RB-57Fs were primarily Air Weather Service sampler versions. Installed equipment included four gas samplers, two air samplers beyond the mid-wing point with paper filter elements, three radiation meters, and voice and data recorders. For other type missions, a F-415P vertical panoramic camera was installed.

The 58th Weather Reconnaissance Squadron at Kirtland AFB, Albuquerque, NM, situated near the Los Alamos Scientific Laboratory (LASL), one of the AEC laboratories they serviced, was the main user of these aircraft for the 10 years they were active. They received their first on 17 June 1964. These RB-57Fs, later redesignated WB-57Fs, served in many parts of the world including: Germany, Japan, Australia, Spain, Argentina, Johnston Atoll, Panama and Alaska, naming only the major overseas locations. During



Above: Special personal equipment – far from being comfortable – is essential on all high altitude flights in the WB-57F. Suited up, Lee Mongeon happily looks forward to seven or eight hours in the Dash 2 pressure suit and WB-57F of the 58th WRS, Kirtland AFB, NM, in 1966. /L. Mongeon



Left: Early warning that the nose wheel would not lock due to mechanical failure of this WB-57F, allowed time to foam the runway to reduce aircraft damage. Cost of repair was under \$10 for fiberglass patch to nose. A high resolution camera (not considered part of the aircraft) took a terrible beating however. /L. Mongeon

periods of known or suspected atmospheric testing of nuclear devices anywhere throughout the world, the WB-57Fs were on hand for nuclear debris sample collecting in the upper atmosphere. These samples when analysed have provided valuable diagnostic data from foreign and US nuclear detonations. The scientific direction for these aircraft was provided primarily by Paul Guthals of LASL. Guthals managed the scientific supervision of the 58th WRS sampling activities both on the ground and, with others, as an airborne Scientific Mission Director.

The 500 series of the 'F' were designed for specialised reconnaissance duties, two of which; 501 and 503, were assigned with the 6091st TRS at Yokota AB, Japan, beginning 16 May 1965, while 500 and 502 went to the 7407th SS at Rhine Main. It was from this squadron that the first loss occurred. Aircraft 287 crashed on 14 December 1965 in the Black Sea at a time when tensions ran high in that part of the world. Russian and American ships vied with one another in recovering the parts of this new American spy plane. Les Lackey and his crewmate Bob Yates were listed as MIA for six months after the crash and then declared dead. The incident was kept very quiet and the true cause - SAMs, structural, or crew factors - has not openly been revealed.

Two other 'Fs' were also lost. In November 1966, 297 piloted by Bob Bartlett crashed into Sandia Crest near Albuquerque. With one

engine out, low on fuel, and in the clouds at night, Bob let down too early and hit the crest at the 10,600ft point just a hundred or so feet below the summit. The final loss occurred in mid-1972, also near Albuquerque, with Lt-Col McGraway as pilot. The airplane inadvertently entered a Mach tuck followed by wing flutter and came apart around 50,000ft. One 'F' was badly damaged and nearly destroyed in a hangar at Karachi as a result of a bomb dropped by an Indian AF Canberra in December 1971.

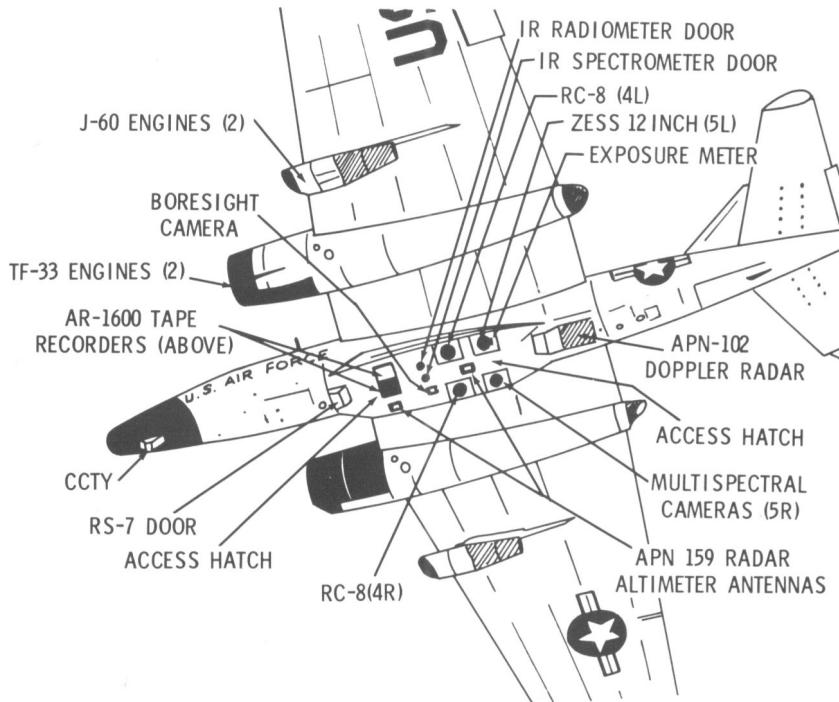
Unlike the early 'Ds', stress corrosion, versus normal corrosion cracks began appearing on the outer wing panels of the 'F' after a few short years of service. These aircraft were sent to GD/FW and Hayes Birmingham frequently for repairs, and in time the decision had to be made on whether to undertake an extensive repair programme, or ground the aircraft. This, coupled with programmatic changes, nine of the fleet were placed in storage at Davis-Monthan in the spring of 1972. This was not a cure for the rest of the fleet and the end of their flying days was near. The 58th WRS, being the last in the Air Force using the WB-57F was deactivated by 1 July 1974 after placing their Canberras into inviolate storage with the others at Davis-Monthan.

This did not end the era of the long wing 'F' however, for some continue to fly at this writing. As early as September 1968, NASA had contracted with the Air Force to operate

Below: Nose access compartment of WB-57F contains air sampling equipment. At right is Paul Guthals, highly regarded for his scientific supervision with Los Alamos Scientific Laboratory for air sampling techniques used throughout the many years that B-57s were used to support this mission. /LASL



RB57F 13501 NASA PALLET



Above: Martin WB-57F, aircraft 501, configured with NASA pallet.

Left: Simplified loading of specialised equipment is facilitated by a removable pallet attached to the fuselage cavity in the same manner that bomb bay doors are handled. Joe Harwell of Lockheed for sensor maintenance support, mans one of four detachable hoists used for removing and attaching the 4,200lb pallet. *D. Anderton*



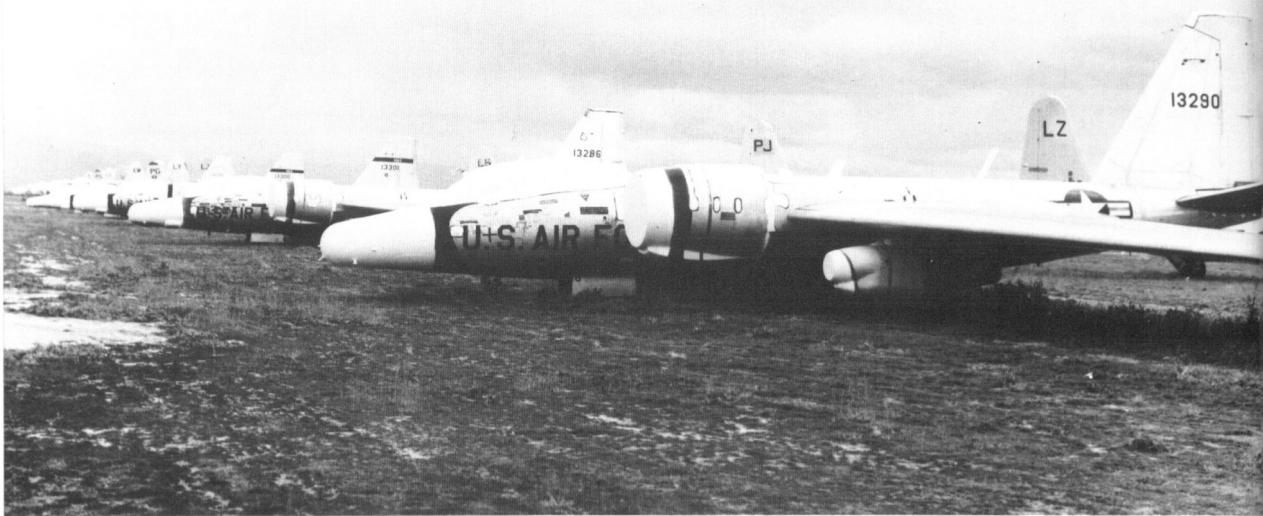
a RB-57F for them in connection with their ERTS (Earth Resources Technology Satellite) programme. The airplane placed on loan was 501 with USAF furnished pilots and maintenance. NASA provided the second station special equipment operators and maintained their sensor systems. Modifications needed to this reconnaissance airplane were basically installing bracketry so that a data gathering sensor pallet could be raised and attached in the centre fuselage area. This pallet changed the bottom of the centre fuselage to a flat surface to facilitate the mounting of cameras and electronic scanners. The pallet was faired in so well that there was no increase in drag. The cost to NASA for this mod was \$3.8 million, and the airplane went into service in July 1969. By January 1972, the Air Force decided it was costing too much money to share the expense with NASA in operating this aircraft, so transferred it to them. This became NASA 925, which was their Earth Survey Aircraft No 3. As the 58th WRS was phasing down in early 1974, 503 was also transferred to NASA and was renumbered NASA 906, ESA No 6. On loan to NASA was a third long wing, 298, and renumbered it NASA 928. This aircraft was and has remained a sampler. The Department of Energy (formerly AEC and ERDA) makes use of this airplane much as they did when the USAF operated the WB-57Fs. In charge of the RB-57F programme for NASA, as well as being a pilot, was Major Robert Danielson from the 58th WRS. When asked to describe how a mission was flown for NASA in these Canberras, Bob gave this account:

'For a typical flight, take-off would be from the operating base closest to the area of interest, photograph the area and/or collect electronic data, and return to the operating location. Most every flight was data productive or at least planned that way. When deploying the aircraft to an operating location, a data acquisition site was planned into the flight so as to be as productive as possible. For a high priority requirement, we would fly from home base and gather in-flight data at a distant site, land at one of the operating locations, refuel, and a second crew would fly the bird home that same day. This way we could have the data processed that same day.'

'One publicised series of missions was data collecting over the corn fields of the mid-west for a project called "Lacie" (Large Area Crop Inventory Experiment). These data were used in the control of corn leaf blight and other agricultural maladies.'

'Flight crews were required to wear full-pressure suits which complicated the operation somewhat, ie, a second crew was required to be on duty to preflight the aircraft and be prepared to fly in case the primary crew did not pass the brief physical exam requirements before each high altitude flight. Also, a pressure suited crew could not fly twice in one day, and a flight duration of 5hr 30min or more required a mandatory crew rest period of 30 hours. Therefore a crew could not fly on two consecutive days if this limit was reached. Under optimum conditions, the aircraft could be flown for approximately 7hr with fuel reserve. This included one hour for the climb phase 5hr 30min for data collection at altitude, and 30min for descent and landing.'

Below: These WB-57F Canberras still perform a mission even while in storage at Davis-Monthan AFB, Arizona. They may again be rehabilitated and used to gather radioactive samples should the need arise.



B-57E 'Cadillac'

All models of the B-57 were not intended for sophisticated reconnaissance or direct encounter with a potential enemy. One such Canberra model was the B-57E, configured on Martin's production line for towing targets. When the first one of these airplanes appeared on our ramp, we admired it like the neighbour's new car. By early 1957, we were accustomed to our B-57Bs smudged and eggshell cracked black paint. The 'E', fresh from the factory, glistened with its shining brilliant orange upper surface and silver painted lower half. I liked flying the 'E' better than the earlier models, for it did have minor improvements, but in truth it was probably because they were newer and cleaner than the tactical version.

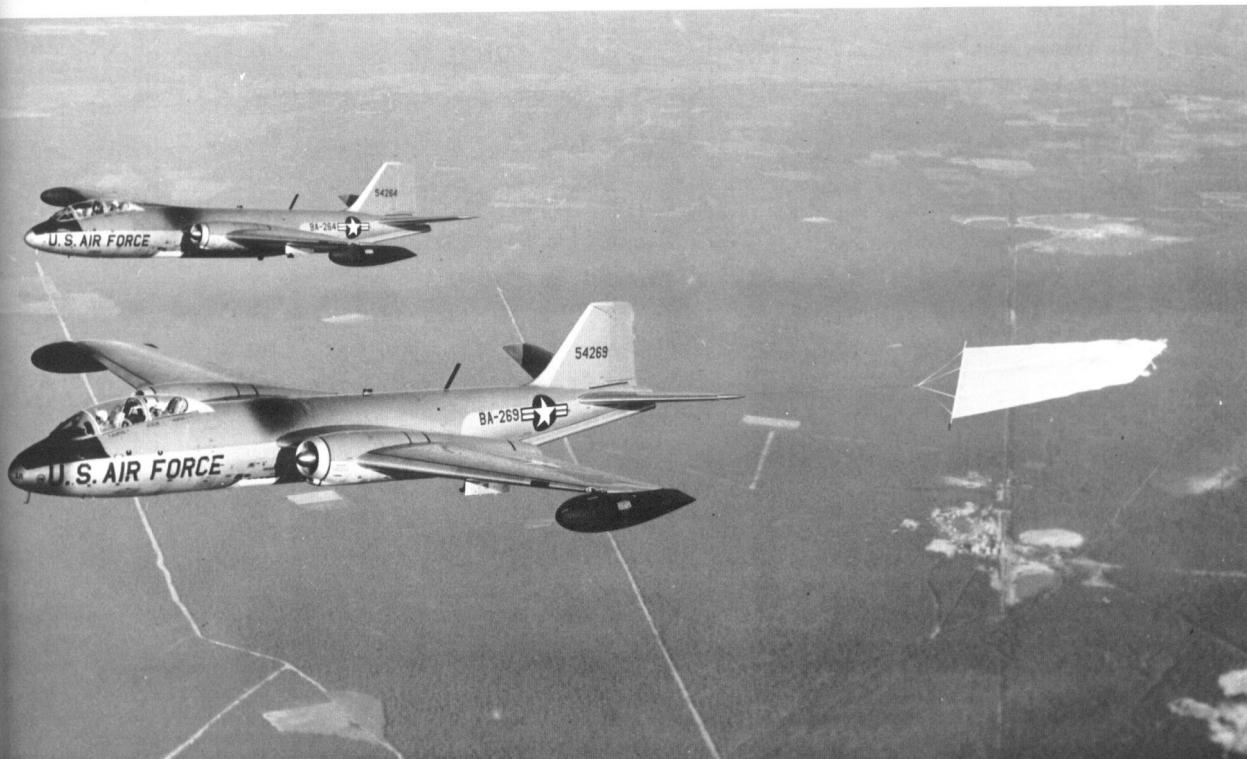
Structurally, the tow target model was a carbon copy of the B-57C dual control model, but without its combat gear. It had tow reel operating equipment installed in the back seat in place of the Shoran bombing system. Additionally, it had a full-time power rudder (allowing a reduced single engine airspeed of 135kts) and yaw damper, and the tail cone was altered slightly to accomodate the two externally mounted target canisters. Sixty-

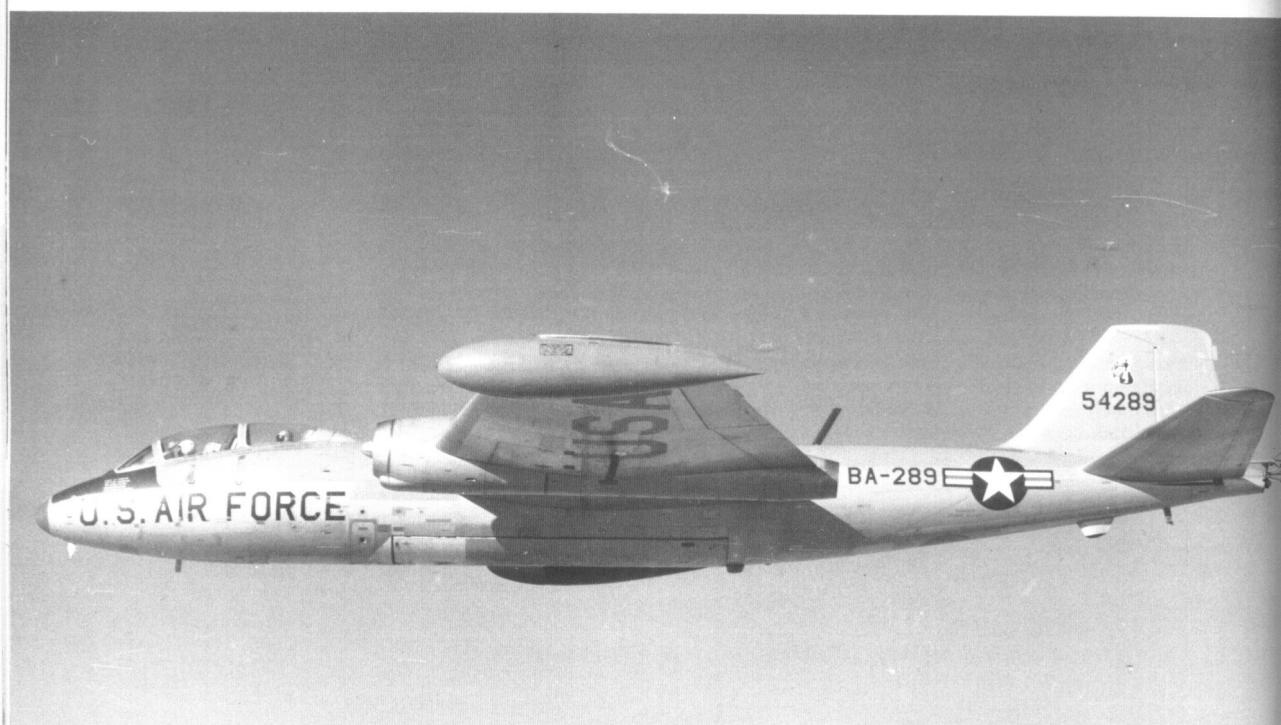
eight of these models were built by Martin on a separate contract.

Northrop designed and built the armour plated tow reels that were mounted on the bomb bay door. Why armour plate steel? At the rate a steel cable-end could whip around the drum within the thin skinned aluminium fuselage and under the volatile fuel tanks, protection was imperative. The bomb bay door would not open on this model and had to be lowered to the ground for servicing. There were four 1,500lb reels mounted on the door, having their centerlines running parallel with the fuselage. Add 1,500lb of armour coated tow cable to each, measuring 6,000ft, and you have a heavily loaded airplane, grossing around 55,000lb.

Launching the target usually started no higher than 30,000ft so there would be sufficient 13th stage air pressure off the engines for operating the turbine on the tow reel. To launch the target, the tow reel operator seated behind the pilot, slowly advanced the system throttle which controlled an air metering valve. Enough air to move the reel a few turns brought in sufficient cable to draw the target rearward out of the canister.

Below: This Martin B-57E has just launched a 9ft x 45ft banner target that will trail 5,000ft on 3/16in armour coated cable before fighter firing passes begin. These 'Es' were built specifically for towing targets, yet had the capability for conversion to the combat roll - and some were. Both these aircraft served in SEA, 269 with the 8th BS and 264 with 'Patricia Lynn'. /Martin







It was here that the skill of the operator counted – not to allow the tow reel to overspeed on the way out, and not to over correct by adding too much air as a brake to the drum's turbine and cause the target to come back to the tail grommet and break off.

When the target was fully deployed, the drag was tremendous with 5,000ft of $\frac{1}{16}$ in cable in tow with a 9ft x 45ft banner target attached. It was a challenge to regain 200kts IAS from behind the power curve at 130kts target launch speed. I recall operating the engines at 100% for the entire first hour of each target towing flight until they could slowly be worked back to 96.5% 'max continuous' as fuel weight burned off. This was a heavy demand on the engines but they held up under the strain.

A chase aircraft, usually a T-33, would drop back occasionally to score the target for holes caused by 2.75in rockets fired by F-86Ds. When firing was completed, the cable was drawn in, bringing the target to within a few feet from the tail. Electrically operated hydraulic cutters would sever the cable and release the target. A second target could then be launched followed by a third and fourth if there was a requirement. Normally, two targets filled the mission and two hours was the maximum target towing range-time for the B-57E. Consequently, to save weight, two of the four reels were removed.

Although the 'E' was built with the capability of having combat equipment added if necessary, few of us ever thought this would become a reality. With the heavy attrition rate in Vietnam caused mostly by the two major ground explosions, 12 'Es' and eight 'Bs' were gathered throughout the Air Force and returned to the Martin plant in late 1965 to be combat configured (see Appendix 7). Consequently, when the war time need arose, the 'Es' served not only as tactical reconnaissance aircraft, but filled the role of light bombers as well.

Top left: The standard bomb bay door served as mount for the target tow-reels. Tow reel operators at Johnson AB, Japan in 1958 wheel the door under the B-57E for hook-up after servicing air turbine drive motor that turns the cable drum.

Above: Target launch method was relatively simple. Air turbine drive cable drum would draw in a short length of cable that was threaded out tail grommet and attached to forward end of target in canister. Once target was in the free air stream, it would unfurl and turbine would act as break to the cable drum.
/C. Gracia

Left: This modified B-57E of the 17th TTS, Yuma, Arizona in 1958, had tail mounted baskets to hold two Delmar frangible radar reflective targets instead of banners. These styrofoam targets required only $\frac{1}{16}$ in cable and due to their light weight and low drag, were towed as high as 40,000ft (and higher) at .74 Mach. F-86Ds and F-89s fired 2.75in rockets, Genies, and radar guided missiles. Tyndall AWC also used this modified system on their B-57Es.
/L. Mongeon



Friendly Enemy; DSES

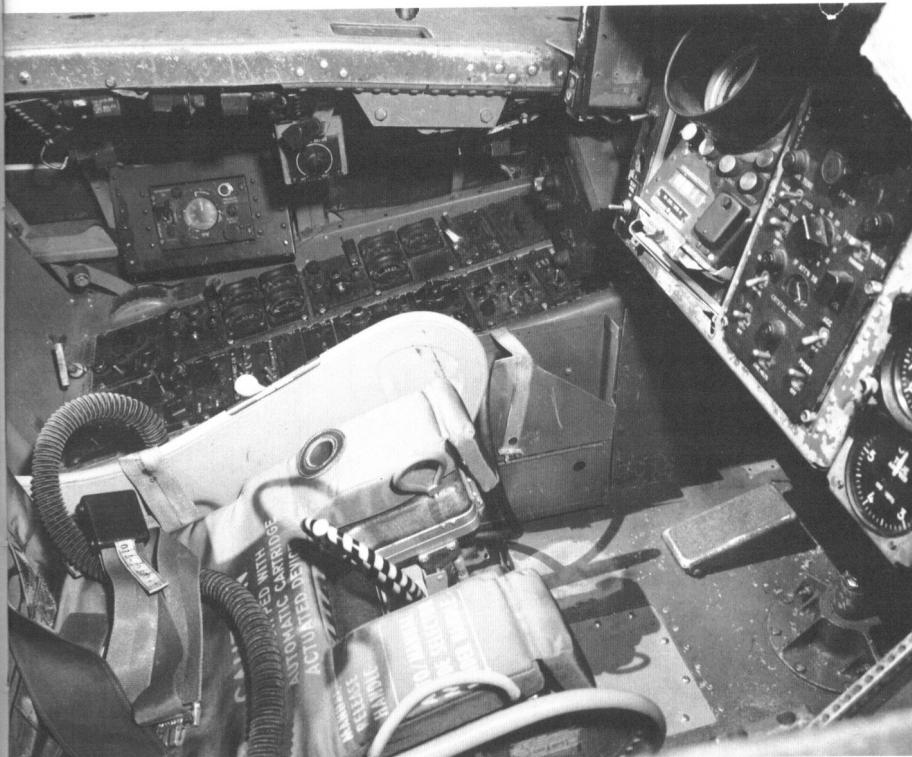
Since the B-57 became operational, it has been used as the most practical and realistic 'faker' or simulated target aircraft for interceptors throughout its career. The explanation is simple; reasonable speed, realistic high and low altitude capability, and sufficient range to begin an inbound track beyond the reach of intercept controlling radar.

In time however, the challenge to the defending fighter pilots and ground control intercept radar (GCI) had to be increased over that of merely detecting and attacking a normal radar reflective target. A would-be enemy would make the problem more difficult. This required special electronic equipment for the target aircraft. A number of Canberras were modified for this special mission beginning around 1959. Initially, RB-57As from inactive reconnaissance units were modified by Martin to have their bomb bay doors refitted to carry the latest electronic

counter-measures and warfare systems to confuse the defenders. After first using air driven generators in the bomb bay to accommodate the added electrical demand, the former engine driven direct drive AC generators were replaced by Sunstrand constant speed units which account for the larger aircoop under the engine air inlet. Wing racks designed for bombs, carried chaff dispensers, and duties of the navigator were replaced by an electronics warfare officer (EWO). As other models of the Canberra became available, the RB-57As gave way to 'Bs' and 'Es' which at this writing carry this mission. Considerable realism can be generated into a simulated aggressor attack mission of the type flown by these Canberras. Surprise to the defenders is the keynote for the B-57 crews. Their unannounced take-off from a nearby field for a typical 'faker' mission is often in the very early morning darkness or any other

Below: This EB-57E flies wing on a F-102 back to Elmendorf AFB, Alaska, after a friendly intercept training mission. On 13 June 1969, this Canberra was accidentally rammed by an F-102 during a normal training intercept. Crews of both planes parachuted safely, but separate helicopters recovered the crews in case one or both were no longer friendly.
/N. Taylor





Left: Converting the rear seat position of this 'E' model into an Electronics Counter Measures aircraft required the removal of flight controls, throttles, and flight instrument panel. They were replaced with ECM controls to be operated by the Electronics Warfare Officer (EWO). Foot pedal is microphone switch. This Douglas seat is fired by pilot if not already done so by EWO, as rocket blast from pilot's seat could be fatal to rear seat occupant.

Below: It was a cold 30min ride from 25,000ft to landing at Comox RCAF Base, Canada, in this 'sports model configured' Canberra in June 1961. While flying a 4677th DSES mission, Ken Holland, pilot, and Jack Davis, EWO, inadvertently lost their canopy and landed an 'open cockpit' EB-57E. Canopies have been recovered undamaged and used again./USAF



Below: The 17th DSES was the last active Canberra unit in the USAF, and operated EB-57Es exclusively. Their all grey aircraft with red tail, nose, and wing tips, have red, white and blue fuselage bands, shown here with the bicentennial insignia of 1976. This later gave way to the unit insignia. On the chaff dispenser is painted '17 DSES' over blue, followed by red and white stripes. Bulge on top and bottom of fuselage waist is TACAN antenna seen on most models./USAF

Bottom: Aircraft of the Defense Systems Evaluation units are frequent visitors to many bases throughout the US, Canada, and Europe in the performance of their mission. The 4713th DSES now inactivated, advertised a bit on their wing tip tank. Fin insignia is Air Defense Command./P. Stevens

time when least expected. The protecting radar scopes may reveal their departure, but once outside the range of their surveillance, the EB-57s (E for Special Electronic Installation) can turn on a tangential course and return as a new and unidentified inbound track. Often times, many EB-57s are used to form separate tracks and provide a coordinated electronic jamming attack to complicate the problem. When inside the range of the radar and in anticipation of interception, chaff is dispensed to confuse the defence force, and electronic pulses jam radar signals. It is up to the defending interceptors and ground radar stations to sort out the correct information.

Units operating these specially equipped EB-57s are Defense Systems Evaluation Squadrons (DSES), in theory replacements for tow target units, giving better training against ground and airborne defence systems, realistically simulating an ECM supported attack. Throughout the 1960s there were a number of these units based around the US and a few overseas locations. Eventually most were absorbed into two squadrons of the

Aerospace Defence Command. The 4713th DSES in the north-east US was stationed at Stewart AFB, NY, Otis AFB, Mass, and finally Westover AFB, Mass. Aircraft of this unit were often seen in Europe in support of USAF fighter activities. The other unit was the 4677th DSES originating at Hill AFB, Utah, and later moving to Malmstrom AFB, Montana. Its area of interest was primarily FIS training for units guarding the Canadian approaches to the US. In 1974, the 4713th DSES at Westover was inactivated and the aircraft were divided between two Air National Guard units, and the 4677th DSES was redesignated the 17th DSES. Operating EB-57Es exclusively, this unit was inactivated in July 1979 and was the last to fly Canberras in the USAF. It shared the Defence Systems Evaluation mission with the Kansas and Vermont Air National Guard units, those being the 190th DSEG at Topeka, and the 158th DSEG at Burlington, both flying EB-57Bs. In 1978, the 190th phased into another aircraft and mission, and the 158th DSEG is the only ANG unit now flying Canberras.





2



3



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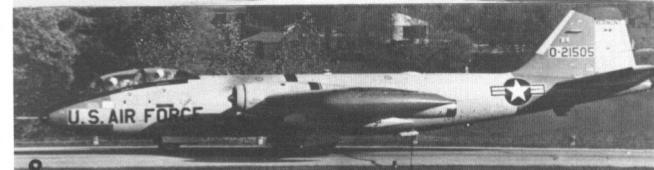
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10

Air National Guard B-57s

The Air National Guard has been a user of the B-57 since early 1958 when regular Air Force units began turning in their Canberras for other equipment. Their initial role within the Guard was that of passive reconnaissance over the United States following any major disaster. This grouping of photos shows a representative aircraft from each of the seven state Guard units. (1) Michigan ANG RB-57A, 491 of the 172TRS, 110 TRG at Battle Creek, October 1962. The state name abbreviation was carried in standard letters on the nose of each ANG aircraft. (2) The Virginia ANG's 149TRS at Richmond was to convert from B-26s to Canberras in 1958. They received one RB-57A, 475 in April and it departed in June since that unit converted to F-84s instead. /F. Hartman (3) The Arkansas ANG had the most colourful markings for their aircraft within the Guard Bureau, using a lavish chrome yellow nose and fin flash. Shown is RB-57A, 440, of the 154TRS 189TRG based at Little Rock, in 1962. (4) RB-57A, 428 of the 117TRS, 190TRG at Hutchinson, showing the change to 'U.S. AIR FORCE' on the nose with the state name KANSAS on the fin and the ANG national insignia which became standard marking around May 1962./D. Anderton (5) The Kentucky ANG gave up this RB-57B, 589 of the 165TRS, 123TRG at Louisville, in January 1965 for combat in SEA. It crashed on take-off 30 June 1965 at Da Nang. Crew escaped. (6) The Nevada ANG based their Canberras at Reno with the 192TRS, 152TRG. This B-57C, 831 photographed in November 1962, was one of 20 refitted for combat in 1965. It was held in reserve in stateside units and now serves with the Vermont ANG. (7) The Kansas ANG absorbed B-57Gs in May 1972 of the 13TBS from Ubon AB, Thailand. Assigned to the 117TBS, 190TBG at Forbes AFB, Topeka, they were retired 2 years later due to excessive systems maintenance problems. This photo taken at Forbes 2 June 1972 shows FK tail code retained from 13TBS./F. Roos (8) In early 1974, two ANG groups assumed the Defense Systems Evaluation role, one being the Vermont ANG with the 134DSES, 158DSEG at Burlington. EB-57B, 505 shown here in 1977, painted grey and red, carries VERMONT on the rudder. The name of this Guard unit, 'The Green Mountain Boys' painted of the chaff dispenser pod perpetuates the reputation of the spirited irregulars of the Vermont Militia dating back to the American Revolution. /W. Lavery (9) When the Kansas ANG retired their B-57Gs, in 1974, they became the 117DSES, 190DSEG equipped with EB-57Bs, one example being 551 shown here in mid-1975. This Canberra, now with the Vermont ANG is expected to be transferred to the National Air and Space Museum in Washington when retired and converted back to tactical configuration for exhibit. This was the last American bomber to be withdrawn from station in South Vietnam. (10) Reminiscent of the mid-1950s when Canberras came from the Martin factory painted black, the 134DSES repainted their B-57C in summer 1977 to look like new. It was an attention grabber! This Vermont squadron is the last Air National Guard unit flying Canberras./D. Menard

Flying the B-57

Imagine this to be your familiarisation ride in the Canberra. Our seat pack parachutes have already been positioned in the aircraft, so climb in the back seat while I make a walk around inspection and check the usual items from the checklist. Once this is done, our clearance filed, and we are strapped in, the hard work is over and what flying is all about is soon to begin.

Battery switch on. Now we can talk to one another on the interphone hot-mike. I've already gone through the 'before engine start' check list which assures that all the switches and handles are in the right place. The right-hand throttle is now moved out of the detent into the idle position and the right engine is ready for start. I signal to the crew chief for wind-up. At the front of the right console panel are two switches marked 'start' and I press one up. Instantaneously, the one shot starter cartridge ignites with a deafening sound like escaping high pressure steam. This starter is a small turbine that connects to the engine turbine and causes it to turn. This burning cycle lasts 10 seconds during which time the engine instruments come to life. Automatically, ignition and fuel take over to bring the engine up to 42% idle speed. What could be simpler? We always watch for a possible over-heat, but I have never seen this happen with the J65 engine – one of the most reliable engines I have ever operated. A check of the hydraulic pressure – it is up – and I signal for the crew chief to pull the landing gear down-lock pins which are then stowed in the right side fuselage access hatch. Be sure your hands are clear of the canopy rail, for the canopy is coming closed. When down and the red warning light goes out indicating it is locked, the left engine is started like the first. Smoke from the starter swirls outside the canopy giving good reason why this engine is started after the canopy is closed. Both starter exhausts eject smoke out the right side of the engine nacelle.

Setting the throttles at 50% reduces the ground noise of the annoying, pulsating rumble-beat which seems unique to J65 engines. The thumbs-out signal to the ground crewmen is given and chocks are pulled. We remove our seat safety pin to arm it for emergency ejection. Ground Control clears

us to taxi and we are on our way. Adding just a little power, our Canberra rolls forward and we tap the brakes as a functional check. Since steering is accomplished by differential braking, adding power to the engine on the outside of the turn eases us out of the confined parking area with no difficulty.

When in position on the runway, the throttles are pushed forward to their limits and the engines wind up quickly with a deafening roar to full RPM. There is a feel that the Canberra is ready to go as vented oil from the engines begins to swirl like smoke around the outside of the canopy. A quick check of all the instruments is made as brakes are released smoothly. The loud noise of the engines slips behind us as we gain speed rapidly, causing an almost quiet, eerie state. The rudder comes into play quickly, replacing

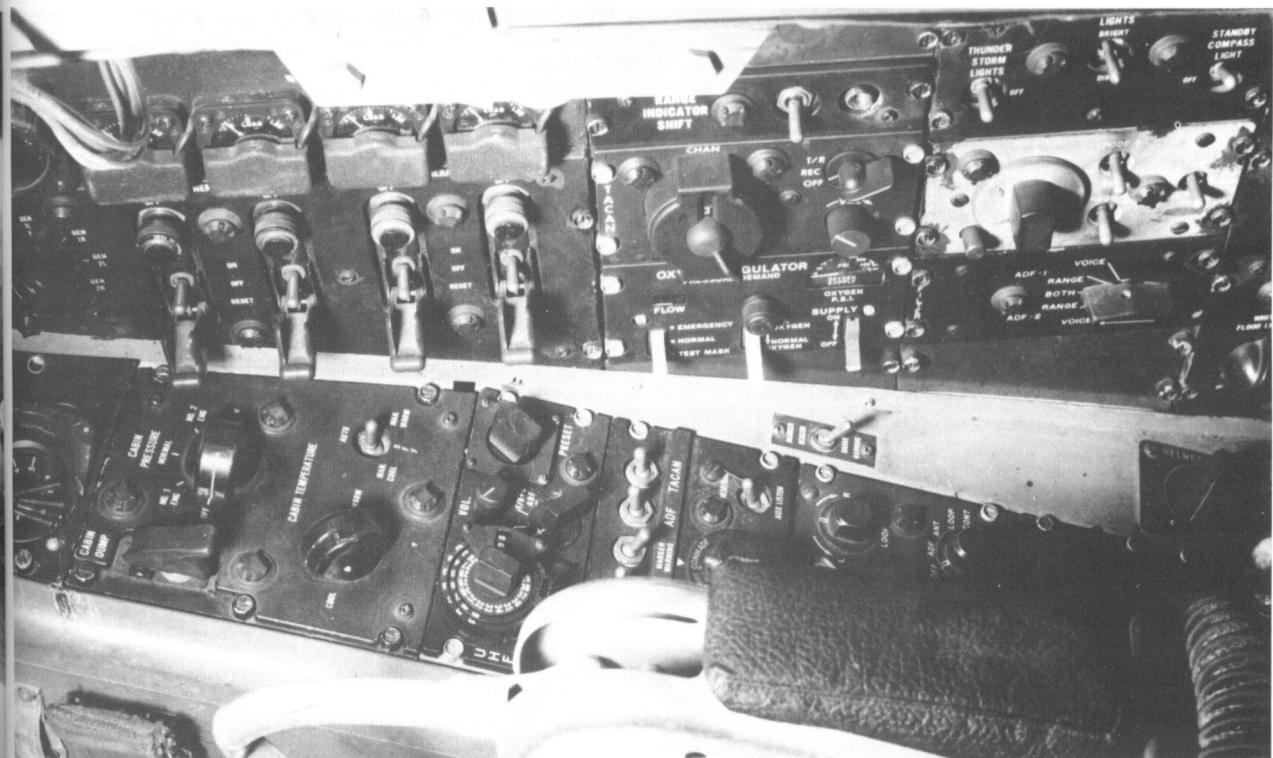
Below: With seat packs and inflatable dinghies already on, author Bob Mikesh gives Ron Cutting a helpful boost up the ladder of the B-57. Looking on is crew chief R. F. Frost. Place is Johnson AB, Japan, 1958.

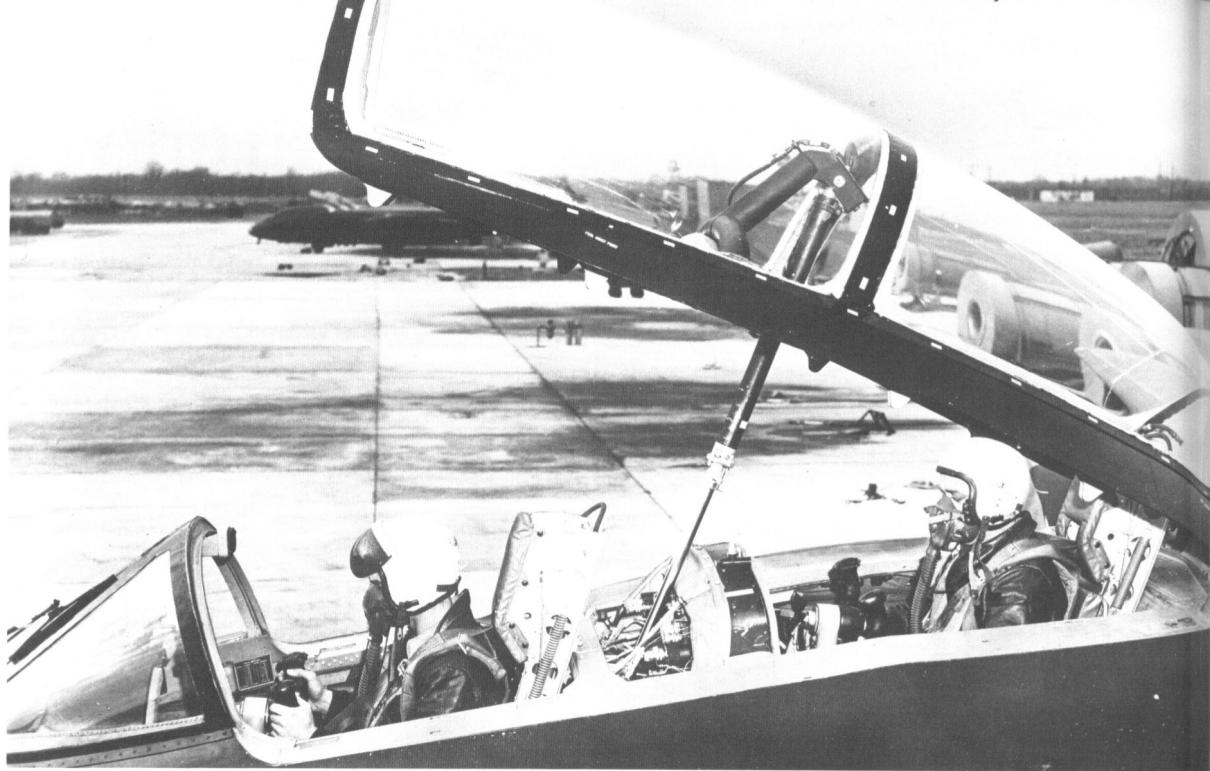




Left: This is the front office of the B-57. Few switches, instruments or controls are considered hard to reach or see. The Canberra is a big airplane to require only one crew member, but it is an easy bird to fly. Arm rests are missed from the old type seats which were deleted on this Douglas ESAPAC seat modification.

Below: Right pilot console.
Above left to right: Four generator switches and voltmeters, TACAN and oxygen regulators, transponder (IFF), radio mixer and light switches. Below; oxygen quantity gauge, cabin pressurisation and temperature control, UHF radio and monitor switches, and partially hidden by early style ejection seat armrest is the automatic direction finder (ADF). /D. Beggerly





Above and right: Before dual control B-57Cs were available to the units, pilot checkouts consisted of one back seat familiarisation ride, then move to the front seat and it was solo from then on. 'Cs' were not long in coming however, and the USAF acquired 38. Their combat potential remained equal to that of the 'B'.

Martin

the brakes for directional control. As we pass 100kts, our forward pressure on the husky control wheel is slowly changed to back pressure and the nose wheel comes off the runway. We hold this level attitude as speed builds. As lift-off speed of 133kts is approached, the nose is raised higher and we are in an attitude to leave the runway in less than 4,000ft (based on 45,000lb take-off weight). The moment of lift-off is hard to detect, mainly because the large tyres dampen the beat of the runway expansion joints. Unwary pilots have been known to retract the wheels too soon, thinking they were airborne only to have the airplane settle down on its belly. In the initial climb there is an illusion that the nose is still slightly down due to the negative slope of the side canopy rail.

Our initial climb is established anywhere between 250 and 360kts, depending on our mission. As we go through 10,000ft we note that cabin altitude has stopped climbing and it should remain there until we reach 20,500ft. From then on it will maintain a constant 3.5psi differential whereby when reaching our optimum level off altitude of 37,500ft, our cabin altitude will be 21,000ft. This is a comfortable pressure, but we still have need to keep our oxygen masks in place.

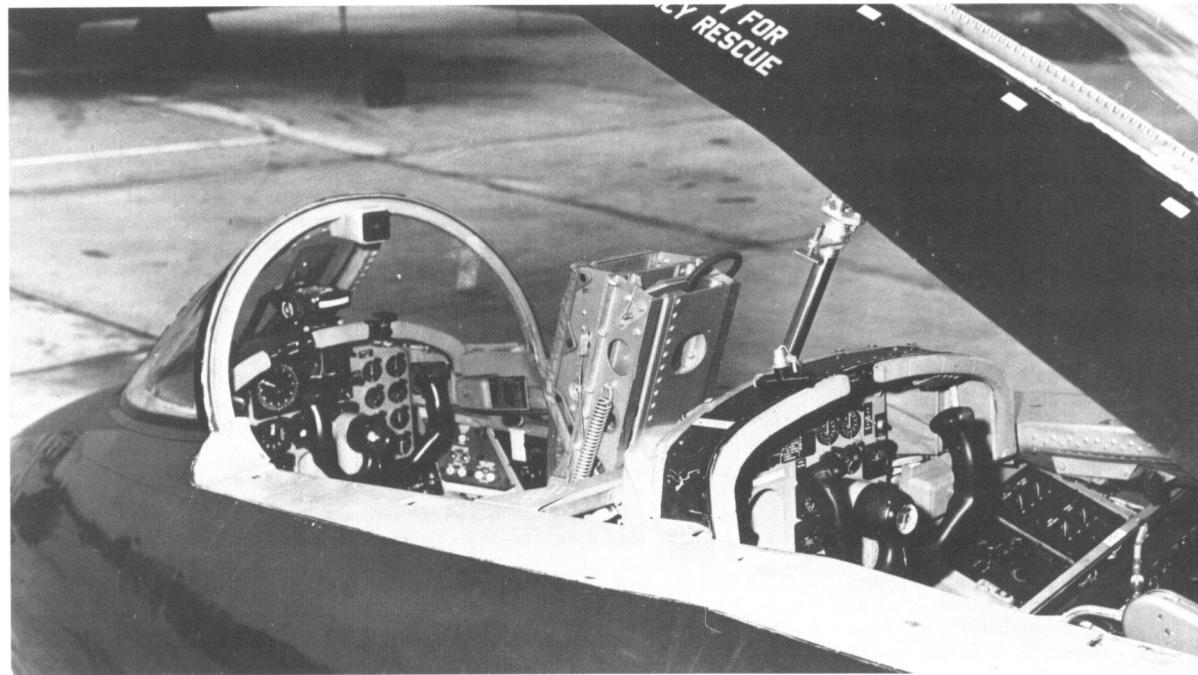
At level off altitude our cruise is 0.73 Mach giving us a true airspeed of 420kts. About 93% RPM will initially hold this speed. The airplane trims up well but it does take some watching to hold it on altitude for it tends to a

slow hunt longitudinally. At any altitude, the B-57 could outmanoeuvre most – if not all – fighters of its prime operational time period. This was a result of its light wing-loading which permitted tighter turns than aircraft with higher wing-loadings. Control forces are heavy at low altitudes since it does not have boosted controls. But a little grunting and groaning on the part of the pilot will make the airplane do what he wants it to do. It has a very positive feel while doing aerobatics such as loops, tight turns, rolls, Immelmann turns, etc. One can easily forget that the Canberra is supposed to be a bomber.

Ten minutes or more before starting descent from a prolonged stay at the cold, high altitude, the canopy defog switch must be turned on. It is easy to be caught short by an early descent before having a chance to pre-heat the canopy. That is why I carry an automobile windshield frost scraper in my leg pocket so I can clear the windshield on the inside – and see to land.

The landing field determines the type of pattern to be flown. Since we are landing at a tactical base we take the option to make a 360deg overhead approach. Our entry is 1,500ft above the ground and lined up with the runway at least two miles out. Speed is stabilised at 250kts (later 300kts) indicated. At the approach end of the runway, things begin happening fast, so hang on to your hat!

Simultaneously, the throttles are brought back to 55%, speed brakes out, and a snappy



left break is established. This is a 60deg bank which is held until a 180deg turn is completed and puts us on downwind leg. Airspeed has dropped to 200kts which is gear lowering speed. The gear handle is placed to the down position, and a slight jolt is felt as the heavy wheels drop out of their wells. After a short rumble they snap into place with a positive feel and we check the indicator lights and the sound of an unsafe gear horn, and we confirm that the gear is locked down. This brings the speed down quickly to 170kts so the speed brakes are brought in by the thumb switch on the right throttle, and the flap switch behind the throttles start the flaps down. Back pressure and a few clicks of the thumb switch on the control wheel for stabiliser trim holds the nose up for a few moments more until reaching 150kts, and a glide is established by lowering the nose.

'Langley Tower, Randy 34, turning base, gear check complete.'

'Randy 34, cleared to land.'

This turn will be a continual one on around to line up with the runway. At the base leg point, airspeed is reduced to 140 and rolling out on short final we are looking for 130kts. We haven't needed power since retarding the throttles to 55% at the break.

On final we are just a little high. Left rudder and right aileron establishes a comfortable slip and altitude is adjusted right where we want it. Over the fence at 110kts and round-out is begun for setting the Canberra right

on the numbers at about 98kts. (Based on 32,000lb landing weight.) Control pressures are moderate provided back pressure is trimmed out. The big tyres and long strut travel makes the B-57 sit down with a soft touch. When on the runway, the nose wheel is lowered slowly and it settles closer to the ground than at take-off. All the remaining fuel is in the forward fuselage tank now, which compresses the nose wheel strut more than when all tanks are fully serviced. Roll out can be near 2,000ft if we planned it that way – but we will spare the brakes and roll to an easy turn-off. Flaps coming up. (There are two flap positions; full 'down' which is 60deg, and 'up'.)

This power-off pattern was a little tighter than considered normal, but it was a procedure I liked to follow for getting the airplane down in the shortest length of time. Throttle adjustments were not necessary and as in the case with flying light aircraft, the runway could be reached in a glide at any point in the pattern. If this flight sequence sounds over simplified, in truth it is not. The B-57 is an easy and operationally comfortable airplane to fly – and it is fun. It is docile and forgiving – but it does have limitations that must not be exceeded. One word of caution that I recall was said by 'Pat' Tibbs, Martin's Chief Test Pilot for the B-57, has kept me alert in the Canberra at all times. 'Anything that will disintegrate on impact with the ground – can kill you.'

The Airplane

There is a personal side about the B-57 that cannot be found in flight manuals or performance curves. What the aircraft can really do is only known by the men that flew the Canberra and understood it intimately for the better part of their Air Force careers. So that I would not impart only one pilot's opinion, I queried many of my colleagues for their viewpoints on selected aspects about the airplane. Their responses often varied, but collectively they provide a good cross section for a pilot's perspective of the Canberra.

When asked what they liked most about the B-57, the list became long. Adjectives heading the list of qualities were: versatility, reliability and simplicity in both operation and maintenance. It was not one of the fastest airplanes for its time, but this was countered by its flight endurance, range, and stability in both level flight and as a gun and bombing platform. The Canberra's manoeuvrability at all altitudes and its twin-engine reliability were strong features mentioned by most pilots. Its cockpit layout was liked by all. Doug Beggerly summed up his opinion of the B-57 as being a 'lovable old thing - comfortable as an old shoe'.

The dislikes about the B-57 made a much shorter list than its good features, and some of those questioned even left this space blank. Poor single engine control at low speed of 155kts minimum (135kts for B-57E) was the most common criticism. A deadly mistake was to allow the good engine to surge to full power at or below this speed, which then exceeded rudder control capability. This took a lot of lives. Some wished for boost on all the controls but recognised that the airframe could have been easily overstressed by overzealous pilots. Canopy fogging often got ahead of the de-fog system and should have been improved. And when it came to replacing spent starter cartridges and cleaning their electrical contact points after each flight - nothing could be grimier.

Performance charts say one thing but practical application is another. Some of the greater distant flights (and most memorable) were the frequent - into the wind and no room for error - flights from California to Hawaii (2,160nm) enroute to the Far East.

Equipped with ferry tanks, they always went over five hours. Bob Lince for instance, logged 6hr 5min in March 1966, to reach Hilo, the closest field short of Hickam AFB, the usual landing point. He calculated 6hr 26min to dry tanks. Other critical overwater flights were from Johnson AB, Japan, to Clark AB in the Philippines (1,650nm) as well as Guam (1,375nm) without ferry tanks, took about 4hr 20min and 4hr respectively. My logs show non-stop flights from Los Angeles to Washington, DC (2,050nm) ranging from 4hr 25min to 4hr 40min without ferry tanks, but we had to be assured of clear weather on arrival, and no delays. This left

Below: During peacetime, tactical flying is one training mission after another. Following a practice weapons delivery sortie at Mito Range, Ellis Bruch (left) with navigator Mike Michaud, discuss their flight as they walk from their B-57 at Johnson AB, Japan in 1957. Back then, AF-blue flying suits were popular./E. Bruch



about 900lb of fuel showing on the gauge. Winds at altitude were always an important factor as well as having alternate airfields if fuel consumption was not as planned.

Time in the air depends on power setting and altitude for endurance as well as distance. For 'fuel on board' we normally filed having 4hr 15min which comfortably left 1,500lb remaining as minimum on cross-country flights. One of the longest flights without a ferry tank was 5hr 10min claimed by Bob Hunter from Reno, Nevada to Otis AFB, Massachusetts (2,250nm). This was in an RB-57A, and the lightest model of the B-57 series. A ferry tank would add another hour to flying time.

What the book claims about altitude is one thing and actual practice is another. Topping 50,000ft with standard wing B-57s became rare as the airplanes grew older and gained weight. When new and often without tip tanks, many topped it for one reason or another. A few worth mentioning are 53,500ft by Jerry Russell, 54,000ft by Jim Goodnight, 55,000ft by Bob Hunter, and 56,900ft by Doug Beggerly. This latter was during the Eniwetok atomic bomb tests in 1956 when the airplanes

were lighter, but I do wonder what the tail-pipe temperatures were reading, for this was often the limiting factor for altitude.

A handful of Air Force pilots have logged close to or over 5,000hr in the Canberra, and that is a lot of time in any military airplane. Paul Pitt logged a staggering 5,209hr in the B-57 before retiring. Another high-timer is Charlie Leonard who finished with 5,060hr, and may be the highest in the 'F' model with 1,808hr. He and Ted Jensen are the only two pilots to have flown all models of production B-57s.

The accomplishments of the Canberra and the men who flew – and still fly her – can go on and on. No one book can contain all there is to be said for this fine airplane. The B-57 has served quietly and modestly, seldom in the spotlight, and therefore may never be voted into the aviation hall of fame. But if the record of its accomplishments were to be examined closely, it must be considered one of the all-time great airplanes. Those of us who knew her, salute the few ships remaining in service, for there will never be a true replacement for the versatile B-57 Canberra.

Below: A goodbye between friends! After 3,633 flying hours, mostly for flight evaluation purposes, this NRB-57A, 435 with modified nose was retired in December 1969 to the aircraft reclamation depot and eventually scrapped. It was a nostalgic flight for both plane and pilot, author Bob Mikesh, who flew this Canberra on its final trip to the bone-yard.



Above and right: This is the Military Aircraft Storage and Reclamation Depot on the desert at Davis-Monthan AFB, Arizona, where surplus aircraft are stored, stripped of parts to keep others flying, and are eventually scrapped. This is a sad ending for these Canberras after they have served their time so faithfully.

Below and bottom right: Assigned to Project Stormfury, this B-57A flew for many years from Miami International Airport for the US Department of Commerce National Oceanic and Atmospheric Administration. This was the second of eight B-57As (52-1419). It now serves as ground maintenance trainer for George T. Baker Aviation School in Miami.





Above: Up to 13 B-57s were assigned at Andrews AFB between 1959 and 1962 for special military administrative flying. Two B-57Es painted all white with day-glo stripes, were equipped with Lear autopilots and assigned to Project Flagstaff for the Office of the Chief of Staff of the Air Force. This airplane was later modified to a RB-57E with a TFR (Terrain Following Radar) system for testing, then flew with Project Patrica Lynn in SEA.



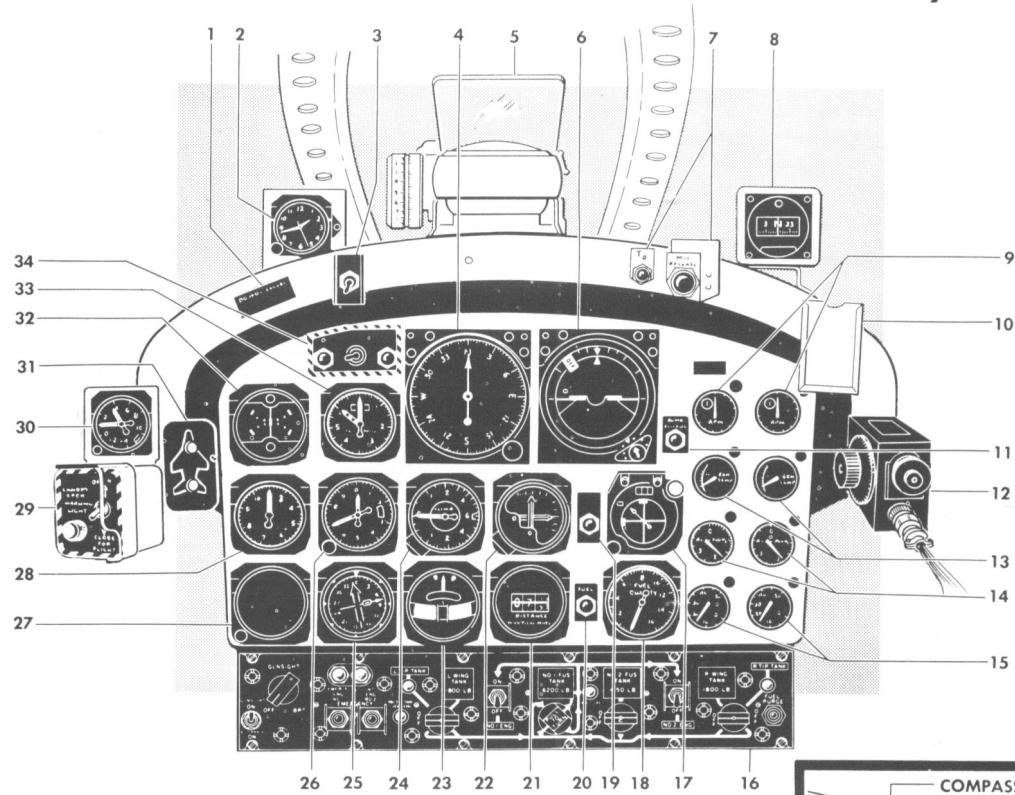
Left: Several B-57s were modified with missile nose sections to air test missile guidance systems. This one was modified by Timco to carry 17ft of the Boeing Bomarc. Separate hydraulic and electrical systems were added for missile guidance, and ammonia and nitrogen tanks were incorporated for cooling and pressurising the missile nose.



Bottom left: Union of TM-76A MACE missile nose with that of a B-57 enabled the Canberra to serve as a missile simulator in navigation for training purposes. A number of B-57s were modified by Goodyear Aircraft Corp in this fashion. Shown here at Sembach AB, Germany is 562 which later became RB-57F 290. /Goodyear

TYPICAL PILOT'S STATION FORWARD VIEW

(AFTER RADIO SET AN/ARN-21 MODIFICATION)



1. INDICATED AIRSPEED WARNING NAMEPLATE
2. CLOCK
3. HORIZONTAL STABILIZER EMERGENCY SWITCH
4. DIRECTIONAL INDICATOR
5. GUNSMITH (REMOVED FROM RB-57B AND RB-57C AIRPLANES)
6. ATTITUDE INDICATOR
7. BOMB RELEASED INDICATOR LIGHTS
8. STANDBY COMPASS
9. ENGINE TACHOMETERS
10. COMPASS DEVIATION CARD
11. BOMB RELEASED INDICATOR LIGHT
12. POSITION SETTING UNIT
13. ENGINE EXHAUST TEMPERATURE INDICATORS
14. FUEL FLOW INDICATORS
15. ENGINE OIL PRESSURE INDICATORS
16. FUEL CONTROL PANEL
17. COURSE INDICATOR
18. FUEL QUANTITY INDICATOR
19. COURSE SETTING INDICATOR LIGHT (B-57C ONLY)
20. FUEL QUANTITY TEST SWITCH
21. RANGE INDICATOR
22. LABS INSTRUMENT
23. TURN AND SLIP INDICATOR
24. VERTICAL VELOCITY INDICATOR
25. RADIO MAGNETIC INDICATOR
26. ALTIMETER
27. FLIGHT COMMAND INDICATOR
28. MACH NUMBER INDICATOR
29. CANOPY ACTUATING SWITCH
30. ACCELEROMETER
31. AN/APN-54 WARNING INDICATOR
32. POSITION DEVIATION INDICATOR
33. AIRSPEED INDICATOR
34. FIRE EXTINGUISHER PANEL



Left: B-57B Pilot's Instrument Panel.

Right: Torque Tube and Blow-Back Rod, and Spring Tab Operation.

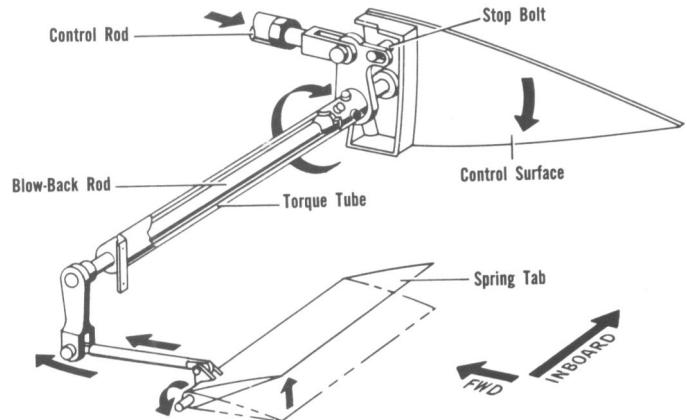
Unique to the Canberra is this method of flight control surface linkage. Under air load conditions, the torque tube twists to absorb the movement of the control connecting rod that would normally move the control under a no-air-load.

Twisting the torque tube rotates the blow-back rod which deflects a spring tab on the control surface. This tab aerodynamically 'flies' the control surface helping it move, and reduces pilot effort, yet maintains conventional control feel at all airspeeds.

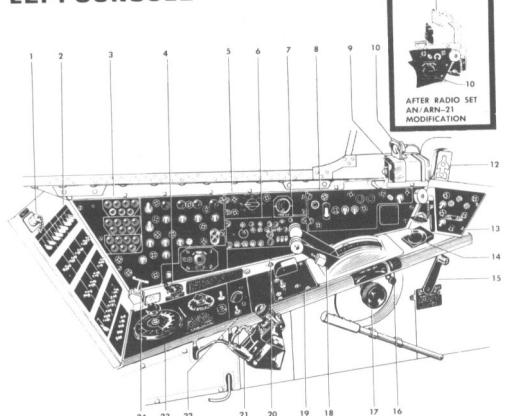
Below: B-57B Pilot's Left Console.

Below right: B-57B Pilot's Right Console.

TORQUE TUBE AND BLOWBACK ROD OPERATION



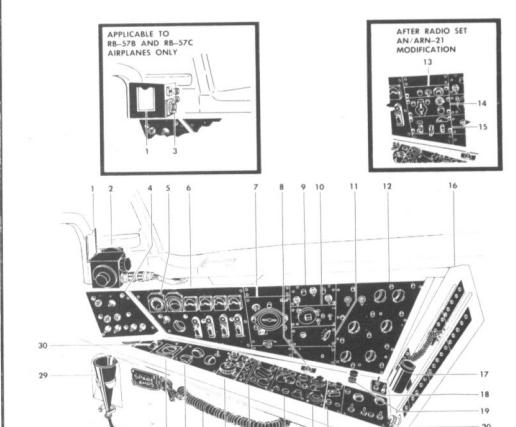
TYPICAL PILOT'S LEFT CONSOLE



APPLICABLE TO RB-57B AND RB-57C AIRPLANES ONLY

1. T-23 POWER RECEPTACLE
2. CIRCUIT BREAKER PANEL
3. HYDRAULIC CONTROL PANEL
4. HYDRAULIC SYSTEM PRESSURE GAGE
5. THERMOMETER
6. SELECTION ELEMENT
7. T-145 CONTROL PANEL
8. THERMOMETER GAGE
9. VACUUM ACTUATING SWITCH
10. STABILIZER POSITION INDICATOR
11. ACCELEROMETER
12. RADAR ALTIMETER INDICATOR (AN APS-54)
13. LANDING GEAR CONTROL PANEL
14. BRAKE PRESSURE GAGE
15. PARKING BRAKE
16. WARNING HORN RELEASE
17. THROTTLE FRICTION KNOB
18. TAIL FLAP AND TRIM CONTROL PANEL
19. TAIL FLAP AND TRIM CONTROL PANEL
20. COMPASS CONTROLS
21. HYDRAULIC HAND PUMP
22. LABS CONTROL PANEL
23. BOMB RELEASE INTERVAL CONTROL
24. EMERGENCY CANOPY RELEASE
25. CAMERA CONTROL PANEL
26. DOME LIGHT
27. VACUUM AND HEATER BLANKET CONTROL PANEL

TYPICAL PILOT'S RIGHT CONSOLE



- * USED ON AIRPLANES INCORPORATING AN/APX-25
1. COMPASS DEVIATION CARD
 2. POSITION SETTING UNIT
 3. CAMERA INTERVALOMETER CONTROL PANEL
 4. NAVIGATION CONTROL PANEL
 5. CABIN PRESSURE GAGE
 6. GENERATOR CONTROL
 7. PARACHUTE
 8. OXYGEN REGULATOR
 9. MARKER BEACON-RADAR
 10. VACUUM TANK
 11. AUXILIARY LIGHTING CONTROL PANEL
 12. TACAN CONTROL PANEL
 13. OXYGEN REGULATOR
 14. CIRCUIT BREAKER PANEL
 15. C-4A LAMP
 16. VACUUM TANK CONTROL PANEL
 17. DEFOG AIR KNOB
 18. WINDSHIELD CONTROL PANEL
 19. RELIEF TUBE
 20. FUEL QUANTITY SELECTOR SWITCH
 21. AN/APW-11 RADAR CONTROL PANEL
 22. IFF CODE CONTROL PANEL
 23. AN/APN-21 COMPASS CONTROL PANEL
 24. AN/AIC-10 INTERPHONE CONTROL PANEL
 25. LINE CONTROL PANEL
 26. OXYGEN HOSE
 27. AIR BREATHING CONTROL PANEL
 28. OXYGEN QUANTITY GAGE
 29. RELIEF TUBE
 30. WINDSHIELD CONTROL PANEL

Combat Transport

As the first B-57s came off the production line in June 1954, Martin proposed to the Air Force a *Utility Courier* based on the basic Canberra airframe. A passenger compartment seating 6–11 extended forward from the main wing spar and added 24in to the length of the nose. Larger capacity centre line wing tip tanks of 600gal each, fuselage tanks behind the wing spar of 915gal and additional tanks in the wings totalled 3,580gal (23,270lb), 140gal (910lb) more than a B-57B with ferry tank. Cabin pressurisation of 8,000ft would be maintained to 40,000ft. Other interior configurations included ECM, bombardier-navigator trainer, photographic-reconnaissance trainer, cargo courier and facilities for litter patients. This proposal did not develop beyond the mock-up stage. Ahead of its time as we now know corporate jets, it was offered to the wrong market; military and not civilian. It would have been a large and expensive airplane in all aspects for the few passenger seats it could provide, but would have been the first in this class of jet.



Side-by-side pilot seating in a new cockpit arrangement was part of the transport version proposal. Engines could be upgraded from the standard J65s to J79s. These 600 US gallon tip tanks were nearly accepted for the B-57B but never adopted.



Above: Interior of this mock-up has four seats and two bunks. When configured with bench seats facing aisle, 11 passengers could be carried. A lavatory was opposite entrance doorway, and ample baggage space was in aft fuselage. Headroom in aisle measured 5ft 8in. *Martin*

Right: This mock-up of the B-57 transport shows cabin access just forward of the starboard wing. Movement of SAC alert crews from one site to another was big selling feature from Martin at the time. *Martin*



Appendices

I Performance Comparison for Selecting Night Intruder

Model	B-26	AJ-1	B-45	Canberra	B-51	A2J-1
Gross weight (lb)	36,300	51,023	95,960	48,421	64,154	56,000
Crew	3	3	3	2	2	3
Engine model	R-2800-79	R-2800-447	J33-A-23	YJ65-W-1	YJ65-W-1	XT40-A-6
Engine rating	2,000bhp	2,300bhp	4,600lb	7,220lb	7,220lb	5,035bhp
Fuel weight (lb) (*denotes internal tanks only)	6,978*	10,902*	36,100	17,973	24,700*	15,720*
T/O ground roll (ft)	4,820	1,357	3,850	2,880	4,980	1,200
T/O over soft obstacle (ft)	5,710	2,400	5,300	3,600	6,350	1,560
Wing loading (lb/ft ²)	66.7	59.0	81.4	50.4	116.5	65.8
Load factor	3.67	4.9	3.88	5.20	6.3	2.67
Combat radius (nm)	800	800	845	990	800	995
Cruising speed (kts)	199	199	400	412	458	363
Max speed at altitude (kts)	319	374	520	550	620	420
Max speed combat altitude SL (*denotes limited by gust)	319	374	472*	434	595	400
Combat altitude	SL	SL	SL	SL	SL	SL
Service ceiling (ft)	27,730	41,000	47,700	51,400	47,800	44,300
Radius of turn and speed at 3.5G	1,000ft-200kts	1,065ft-172kts	1,150ft-208kts	950ft-175kts	2,670ft-297kts	See LF
Approach speed (120% Stall) (kts)	97	102	115	88	121	94
Stalling speed at landing wt (kts)	81	85	88	73	105	79
Footprint pressure (psi) (*denotes 39% over-weight)	Main 69 Nose 70	Main 101 Nose 118	Main 167 Nose 160	Main 100 Nose 74	Front 65 Rear 78	Main 119* Nose 120
Landing weight (lb)	26,380	35,062	53,935	29,241	37,168	38,852
Landing distance, ground roll (ft) (Wheel brakes only)	2,000	1,742	2,860	1,300 max brake	2,665	
Mission time (hr min)	8.22 108	8.32 160	4.17 323	4.98 200	3.65 264	5.74 298
Reserve at long range speed						
Target action (minutes at long range at altitude)	44	50	30	38	47	24
Take-off rate of climb (fpm)	1,300	2,530	7,750	5,700	6,700	4,250

2 B-57B Canberra (Tactical bomber version) Facts and Figures

Designer and Manufacturer: Basic design by English Electric Co, and The Martin Co, produced the American models

Wingspan: 64ft

Length: 65ft 6in

Wing area: 960sq ft

Weight: Empty weight about 27,000lb Fueled for T/O about 45,000lb. Maximum weight 55,000lb

Max speed: 444kts IAS with tip tanks

513kts IAS without tip tanks but not to exceed .78 Mach with tip tanks; .82 to .85 Mach is buffet area

Normal cruise: About 420kts TAS, or .74 Mach

Service ceiling: Above 53,000ft

Propulsion: Two J65-W-5 or J65-BW-5 engines, each 7,220lb st at sea level

Armament: Eight M-3 .50cal MGs with 300 rounds each up to 52-1575. Four M-39 20mm cannon with 200 rounds each from 52-1576 on

Example of Stores Capability: Internal

Four 1,000lb bombs, nine 500lb bombs, 21 260lb bombs, or two Mk 9 1,500lb Special Weapons

On wing pylons Four 750lb stores or less
Rockets Eight 5in HVAR, or 28 2.75in FFAR.
 Double if wing bomb pylons are utilised

Ferry Range: More than 2,000nm with reserves using ferry tank, zero-wind

Fuel (usable):

		US Gal	Pounds
Fus Main	1	1,010	6,565
Fus Aux	1	662	4,303
Wg Outboard	2	580	3,770
Wg Drop	2	640	4,160
Total		2,892	18,798
Ferry tank		548	3,562

3 Martin B-57 Production Record

Model	Serial Numbers	Quantity
<i>Contract AF33(038)-22617</i>		
Canberra	51-17352 (B2 WD940)	(1)
Canberra	51-17387 (B2 WD932)	(1)
B-57A	52-1418 to 52-1425	8
RB-57A	52-1426 to 52-1492	67
B-57B	52-1493 to 52-1594	102
<i>Contract AF33(600)-22208</i>		
B-57C	53-3825 to 53-3858	34
B-57B	53-3859 to 53-3935	77
B-57C	53-3936	1
B-57B	53-3937 to 53-3939	3
B-57C	53-3940	1
B-57B	53-3941 to 53-3943	3
B-57C	53-3944	1
B-57B	53-3945 to 53-3947	3
B-57C	53-3948	1
B-57B	53-3949 to 53-3962	14
<i>Contract AF33(600)-25825</i>		
RB-57D	53-3963 to 53-3982	20
<i>Contract AF33(600)-29645</i>		
B-57E	55-4234 to 55-4301	68
	Total:	403

4 Martin RB-57D Variations

Group	Serial	Model	IFR*	Crew
A	53-3977	RB-57D	No	1
	to 53-3982			
B	53-3970	RB-57D	Yes	1
	to 53-3976			
C	53-3964	RB-57D-2	Yes	2
	to 53-3969			
D	53-3963	RB-57D-1	Yes	1

*In-Flight Refuelling

5 General Dynamics RB-57F Production Record

Serial	Constructed from	Model
63-13286	52-1559	B-57B
63-13287	53-3864	B-57B
63-13288	52-1539	B-57B
63-13289	52-1527	B-57B
63-13290	52-1562	B-57B
63-13291	52-1574	B-57B
63-13292	52-1594	B-57B
63-13293	52-1583	B-57B
63-13294	53-3935	B-57B
63-13295	53-3918	B-57B
63-13296	53-3897	B-57B
63-13297	53-3900	B-57B
63-13298	52-1536	B-57B
63-13299	52-1573	B-57B
63-13300	52-1427	RB-57A
63-13301	52-1432	RB-57A
63-13302	52-1433	RB-57A
63-13500	53-3972	RB-57D
63-13501	53-3975	RB-57D
63-13502	53-3970	RB-57D
63-13503	53-3974	RB-57D

6 Martin B-57G Conversions

52-1578	53-3886
52-1580	53-3889
52-1582	53-3898
52-1588	53-3905
53-3860	53-3906
53-3865	53-3928
53-3877	53-3929
53-3878	53-3931

7 Martin B-57s Reconfigured for Combat at Martin Factory, late 1965

B-57B 52-1498	B-57E 55-4238*
52-1499	55-4248
52-1510	55-4251*
52-1550	55-4259*
52-1590	55-4265
53-3827	55-4268
53-3831*	55-4269
53-3838	55-4270
	55-4274*
	55-4282
	55-4284
	55-4285*

*Indicates were not deployed to SEA

8 Martin B-57s (25) Delivered to Pakistan late 1959

B-57B	53-3885	53-3952
	53-3891	53-3954
	53-3938	53-3955
	53-3939	53-3956
	53-3941	53-3957
	53-3942	53-3958
	53-3943	53-3959
	53-3945	53-3960
	53-3946	53-3961
	53-3947	53-3834
	53-3949	53-3846
	53-3950	53-3948
	53-3951	

9 Tail Codes for B-57 Units, 1967 on

PQ	8TBS, 405TFW, latter assigned to 35TFW
PV	13TBS, 405TFW, Clark AB, Philippines
FK	13TBS, 8TFW, Ubon, when equipped with B-57G
FS	4424 CCTS, 15TFW, later 1TFW, MacDill AFB, trained B-57G crews
GT	556RS, 347TFW, Yokota, later Kadena, EB-57Es
JM	4461 TEWS, 363TRW, was 4416CCTS
JO	22TRS, later 62TRS, 363TRW, Shaw AFB

CCTS=Combat Crew Training Squadron

TEWS=Tactical Electronics Warfare Squadron

10 Martin B-57 Combat Effectiveness

To evaluate in true perspective, the effectiveness of any one airplane in combat, it must be compared to all participating airplanes. The following three tables reveal much by which to evaluate, but weapon delivery accuracy, and bomb damage assessment are difficult, if not impossible to record for true comparison. It was in this unrecorded area that the B-57 was recognized for its effectiveness.

Sortie Generation Rate in SEA

(Average daily sortie per aircraft; total sorties [minus training and maintenance] divided by daily average of possessed aircraft, divided by days of month)

	1968 Monthly Average	1969 January to June
A-1	<u>1,441</u> = 0.79	<u>1,573</u> = 0.86
	59	61
A-26	<u>290</u> = 0.72	<u>321</u> = 0.67
	13	16
A-37	<u>1,260</u> = 1.85	<u>747</u> = 1.25
	22	20
B-57	<u>686</u> = 1.01	<u>337</u> = 1.12
	22	10
F-4	<u>6,270</u> = 0.98	<u>6,498</u> = 0.97
	207	224
F-100	<u>8,192</u> = 1.15	<u>7,571</u> = 1.06
	229	238
F-105	<u>2,776</u> = 0.86	<u>2,116</u> = 0.86
	104	82
RF-4	<u>1,849</u> = 0.86	<u>1,912</u> = 0.86
	69	74
RF-101	<u>424</u> = 0.85	<u>395</u> = 0.82
	16	16

USAF Sorties in South Vietnam only

	1967				1968	1969
	Total sorties	Combat sorties	Total sorties	Combat sorties	Total sorties	Combat sorties
A-1	3,712	3,000	4,042	3,166	2,621	2,055
A-26	0	0	0	0	0	0
A-37	0	0	15,033	14,447	8,761	8,305
B-57	5,818	5,570	2,064	1,605	526	421
F-4	20,284	16,392	25,381	23,134	21,965	19,185
F-100	83,782	80,398	92,612	88,250	57,561	52,699
F-105	0	0	2,072	1,811	0	0
RB-57	1,153	1,017	1,073	1,021	1,110	1,058
RF-4	8,540	7,996	9,173	8,719	7,221	7,039
RF-101	2,937	2,650	3,762	3,498	2,942	2,637

USAF Aircraft Loss Rate in SEA

	In South Vietnam			In North Vietnam			In Laos			* Average Rate
	Losses	Sorties	*Rate	Losses	Sorties	*Rate	Losses	Sorties	*Rate	
A-1	28	26,539	10.6	18	2,612	68.9	62	39,012	15.8	15.8
A-26	0	0	—	0	75	0	10	9,567	10.5	10.4
A-37	5	27,527	1.8	0	0	—	0	978	0	1.8
B-57	15	15,488	9.7	5	3,089	16.2	11	13,225	8.3	9.7
F-4	43	72,789	5.9	135	88,973	15.2	46	93,892	4.9	8.8
F-100	127	279,398	4.5	16	3,677	43.5	20	19,609	10.2	5.4
F-105	1	2,056	4.9	274	76,858	35.6	41	54,620	7.5	23.7
RB-57	2	5,581	3.6	0	52	0	0	119	0	3.5
RF-4	6	29,004	2.1	32	16,472	19.5	12	21,088	5.7	7.5
RF-101	2	14,154	1.4	27	9,726	27.8	3	8,701	3.4	9.8

* Loss rate per 10,000 sorties

II B-57 Unit Assignments

54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78

Tactical Bomb Squadrons

3rd TBG/W, Japan & SEA
8th TBS

13th TBS
90th TBS

38th TBG, Laon AB, Fr
71st TBS

405th TBS

822nd TBS

345th TBG/W, Langley AFB
498th TBS

499th TBS

500th TBS

501st TBS

461st TBG/W, Hill-Blythville

764th TBS

765th TBS

766th TBS

17th TBG, Hurlburt Fld

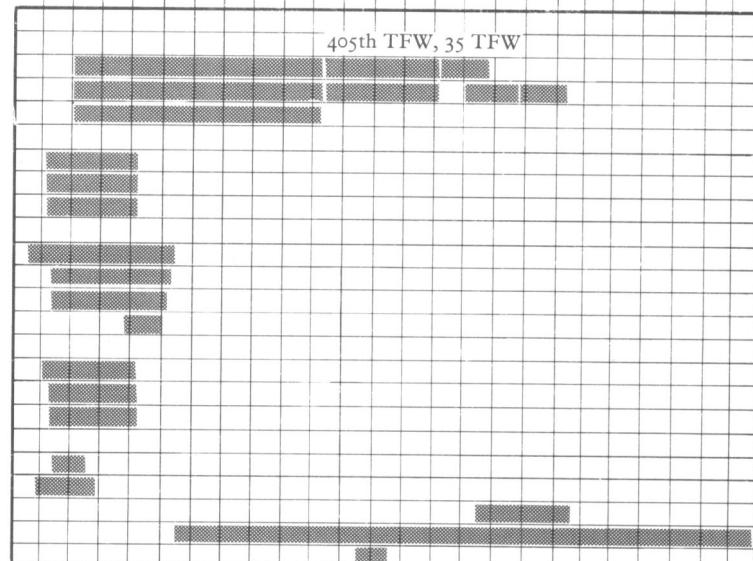
34th TBS

3510th CCTW, Randolph

4424th CCTS, MacDill AFB

Pakistan AF, 31st Wing

Vietnamese Air Force



Tactical Reconnaissance Squadrons

363rd TRW, Shaw AFB, SC

41st TRS

43rd TRS

4416th TEWS

22nd/62nd TRS

10th TRW, Ger & Fr

1st TRS

66th TRG, Sembach, Ger

30th TRS

33rd TG, Det 1, TSN

6250th CSG, Det 1, TSN

460th TRW, Det 1, TSN

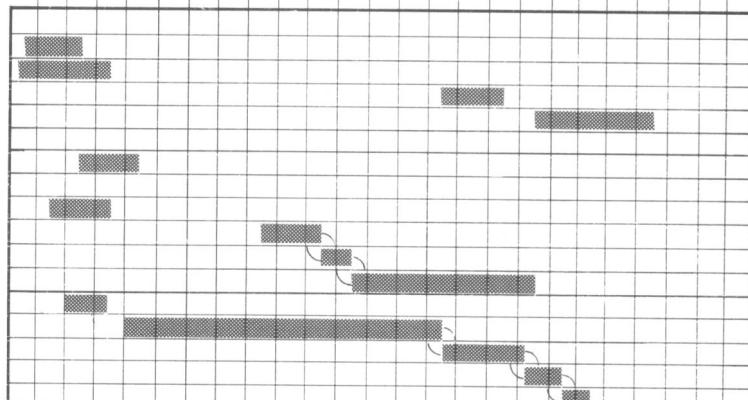
6021st RS Yokota AB

6091st RS Yokota AB

556th RS Yokota AB

556th RS Kadena AB

18th TFW Kadena AB



Tow Target and Defense Systems Evaluation Squadrons

3rd TTS, George AFB, CA

6th TTS, Johnson AB, Japan

TTF 8BS, Johnson AB, Japan

7272nd AGG Wheelus, Trip

4756th TTS, Tyndall AFB, FL

17th TTS, Yuma AFB, MacDill AFB

1st TTS, Biggs AFB, Texas

1st ATS, Biggs

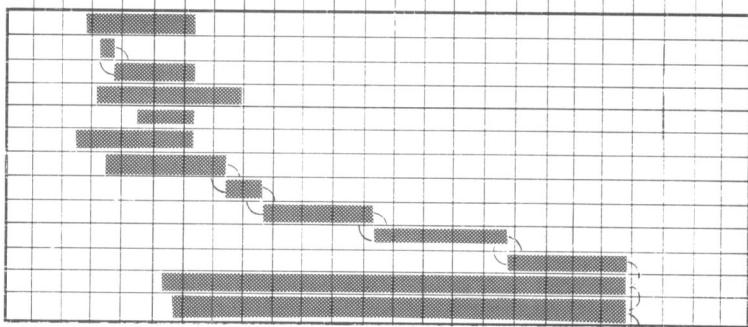
4758th DSES, Biggs AFB, Texas

4758th DSES, Holloman AFB, N.M.

Det 1, 4677th DSES, Holloman

4677th DSES, Hill - Malmstrom

4677th DSES, Stew, Otis, Westover



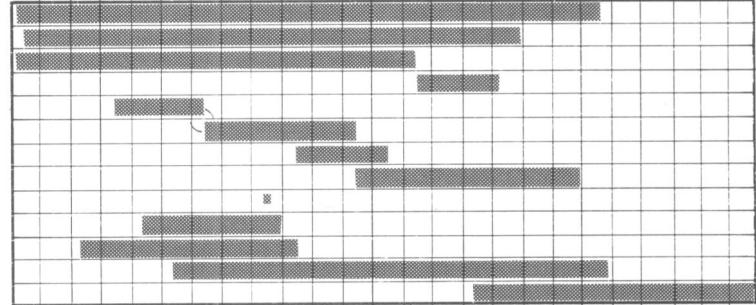
Unit

54|55|56|57|58|59|60|61|62|63|64|65|66|67|68|69|70|71|72|73|74|75|76|77|78

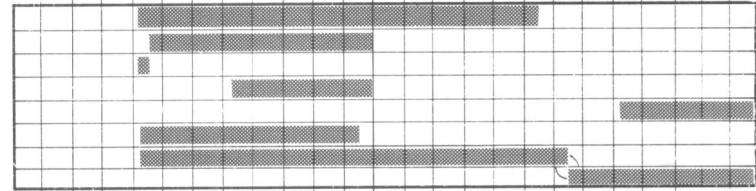
17th DSES, Malmstrom AFB, MT
 5040th RES, Alaska
 5041st TOS, Alaska

*Support Units*

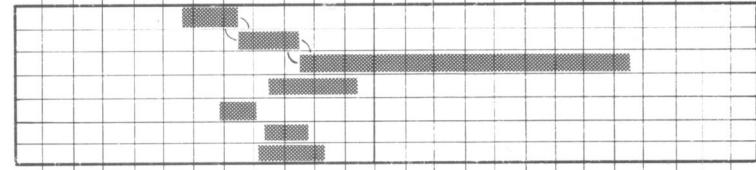
Edwards AFB, Calif
 Eglin APG, Florida
 Wright (A)DC, Ohio
 4950th Test Wing, W-P, Ohio
 6550th OS, Patrick AFB
 AF Missile Range, Patrick AFB
 AF Missile DC, NM
 RADC, Griffiss AFB, NY
 ADC HQ, Peterson Field, Col
 1001st OG, Andrews AFB
 FAA Flight Check
 US Dept of Commerce (Wx)
 NASA, Houston, Texas

*Air National Guard Units*

172TRS, 110TRG, Michigan ANG
 162TRS, 123TRG, Kentucky ANG
 149TRS, 106TRW, Virginia ANG
 192TRS, 152TRG, Nevada ANG
 134DSES, 158DSEG, Vermont ANG
 154TRS, 189TRG, Arkansas ANG
 117TRS, 190TRG, Kansas ANG
 117TBS/DSES, 190G, Kansas ANG

*Weather Reconnaissance Squadrons
(Standard Wing B-57s only)*

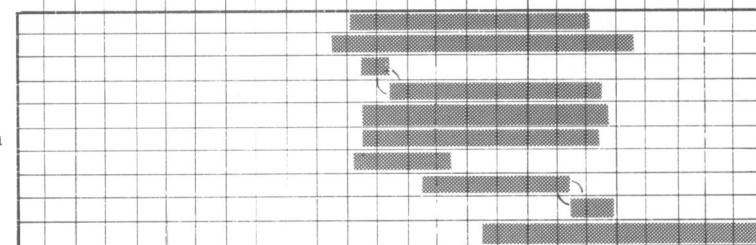
4926th Test Sqn, Kirtland AFB
 1211th Test Sqn, Kirtland AFB
 58th WRS, Kirtland AFB, NM
 57th WRS, Avalon, Australia
 55th WRS, McClelland AFB, CA
 55th WRS, Det 1, Eielson, AK
 54th WRS, Guam Island

*Users of RB-57Ds*

4028th SRS, Turner AFB, GA
 4028th SRS, Laughlin AFB, TX
 4028th SRS, Det, Yokota AB
 4028th SRS, Det, Rhine Main
 7407th Support Sqn, Rhine Main
 1211th Test Sqn, Kirtland AFB
 58th WRS, Kirtland AFB, NM
 4677th DSES, Hill AFB, Utah
 Wright-Patterson ASD, Ohio
 Nationalist Chinese Air Force

Users of RB-57Fs

7407th Support Sqn, Rhine Main
 58th WRS, Kirtland AFB, NM
 58th WRS, Det East Sale, Australia
 58th WRS, Det Mendoza, Argentina
 58th WRS, Det Eielson AFB, Alaska
 58th WRS, Det Albrook AFB, Panama
 6091st RS, Yokota AB, Japan
 56th WRS, Yokota AB, Japan
 9th WRG/W Det 3, Yokota AB, J
 NASA, Houston, Texas



Key to Abbreviations

(A)DC	(Air) Development Center
AFB	Air Force Base
AGG	Aircraft Gunnery Group
APG	Air Proving Ground
ASDC	Air Systems Development Command
ATS	Aerial Tracking Squadron
CCTS(W)	Combat Crew Training Squadron (Wing)
CSG	Combat Support Group
DSES	Defense Systems Evaluation Squadron
FAA	Federal Aviation Administration
NASA	National Aeronautics and Space Adm.
OG	Operations Group

RADC	Rome Air Development Command
RES	Radar Evaluation Squadron
RS	Reconnaissance Squadrons
SRS	Strategic Reconnaissance Squadron
TBG/W	Tactical Bombardment Group/ (later) Wing
TBS	Tactical Bombardment Squadron
TEWS	Tactical Electronics Warfare Squadron
TFW	Tactical Fighter Wing
TOS	Tactical Operations Squadron
TRG(S)(W)	Tactical Reconnaissance Group (Squadron) (Wing)
TTF	Tow Target Flight
TTS	Tow Target Squadron
WRG(S)(W)	Weather Reconnaissance Group (Squadron) (Wing)

Below left: This NRB-57A met with misfortune in 1968 when its nose gear would not extend. Foamed runway at Griffiss AFB, NY prevented serious damage. Canopy was blown by pilot Larry Cunningham as standard measure for emergency landings of this type. Aircraft 435 had been one of two modified to accommodate special high altitude day radar mapping APS-60 in the late 1950s.

Below: Air sampling WB-57Bs with frequent deployments to the Pacific needed additional range than was originally designed into the Canberra. Approximately six were fitted with two F-84F air pressurised drop tanks giving maximum fuel load for B-57s of 25,000lb (3,846 US gal) Due to the added drag, they offered a mere 20 minutes air time, but made the westward trip to Hawaii less critical with headwinds. For ferry flights, standard tip tanks replaced sampler wing tip pods shown here.

